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WHAT IS THE JOB?*

BY

The Rt. Hon. Lord HORDER, G.C.V.O., M.D., F.R.C.P.

Between my own medical Alma Mater at St. Bartholomew's and King's there has always been a close relationship. In the latter half of the last century we sent you Richard Partridge and Arthur Farre. During the first half of 1900 we sent you no fewer than five of my own colleagues and friends: T. P. Legg, Emery, Tunnicliffe, Stanley Woodwark, and Colwell. More recently we have added Oakley and Magnus. You have not been so generous to us, but we have been grateful for Claye Shaw, one of my own teachers, for Geoffrey Harrison, and more recently for Eric Strauss.

If I pass from the more general to the more particular and personal view of King's men, I owe much to the teaching of Kingston Fowler, Burney Yeo, Nestor Tirard, and Watson Cheyne. I was happy to count as colleagues and friends Aldred Turner, Lambert Lack, Thomson-Walker, StClair Thomson, George Frederic Still, Robert Knox, and Arthur Whitfield. All these men added to the greatness of your school and to the growth and dignity of Medicine. Not to have known them would have argued myself unknown. But these are names which occur to my mind quickly; there are others in their generation that I am sure I should readily recall if I studied more closely the carefully documented volumes dedicated with such loyal devotion to King's men by Willoughby Lyle. Of King's men of the present generation, though I have ceased to belong to it, I could also speak with intimate knowledge. But that would be invidious. Suffice it to say—and I have plenty of reason for knowing—that they form a team second to none in the leading medical schools of the Empire. It is clear, therefore, that you have not only a great tradition to maintain but every stimulus and encouragement to this end.

Your New Job

And what, now, is the job to which you will put your hand, you who are just beginning, the "grind" of the preclinical part of your curriculum being over?—as to which I have said my say years ago on occasions very like this, but unheeded. I don't complain. Much better men have gone unheeded. My plea has always been that the anatomy, the physiology, the chemistry, and the physics of the preclinical studies of the medical student should be directed towards the actual examination of the patient.

I think we took a step backwards when we put the academic anatomist, physiologist, and chemist in charge of preclinical studies. These men staked out large claims in their respective spheres as though medical students were in training for professorships in these subjects rather than being doctors in embryo. This view led me to plead for spending less time over the intimate structure of the organ of Corti and the theories of colour vision, and more time over surface markings of the viscera, the ophthalmoscope, the laryngoscope, the Thoma-Zeiss pipette, and other simple instruments by which the structure and functions of the normal body are studied. I urged these things so that when the student entered the wards he should not be faced with an entirely new animal in the shape of the patient.

I think that many preclinical professors do orientate more in the direction I have outlined than was the case a generation ago. But I still meet doctors who have never seen the optic disk clearly, nor the vocal cords at all.

But that reference to preclinical studies is a digression. You are now embarked upon the study of Medicine, and if you want a definition I can suggest nothing better than that Medicine is the art and science of healing—which was indeed the meaning ascribed to the word in primitive times. True, we have come to stress the importance of prevention of disease, viewing the doctor as a "health man" more than a "medicine man," but this enlarged connotation of the doctor's function is implicit in our definition.

Prerequisites for the Doctor

But if we ask the doctor not only to cure us of our ills but to keep us well there are two prerequisites to be considered. (i) The first is that the doctor must know all about the mind as well as about the body: he must know "human nature," as it is called, as no other person knows it. The Greeks held this idea very firmly, and, logical as ever, they did not consider that a doctor could play his part in the social economy if this desideratum was not present. (ii) The other prerequisite to keeping the fit fit, and making the near-to-fit quite fit, is that more attention must be given to providing the basic elements for the maintenance of health: enough of the right sort of food; warmth and shelter; access to the sun and air; a satisfactory job of work; leisure and the amenities connected with it. Obviously this second prerequisite to "positive health" is the business of the State rather than of the doctor.

It has fallen to my lot to see great developments in Medicine, both in its science and its art: radiology, chemotherapy, endocrinology, thoracic and brain surgery,

*Slightly abridged version of the inaugural address given at the opening of the 122nd winter session of King's College Hospital Medical School.

psychiatry, physiotherapy, and the rest. Time will not permit me to enlarge about them. The contributions they have made to medical care have been incalculable. They have also opened up more channels for the ultimate choice of the practitioner, so that, if that intimate contact with the patient which general practice gives in such unique fashion does not appeal to his temperament, he can find his niche in some other branch of Medicine.

Some Mild Criticism

But I think the trend in the direction of new special branches of Medicine should be watched carefully. In respect of two of these I have some mild criticism to offer.

(i) Humanist though I am, and whole-hearted supporter of the thesis that Medicine should be made 100% available to the people, I have never been quite convinced that the notion underlying the new branch of it which has been called "social medicine" has justified itself. No colleague of mine brought a clearer mind to bear on most things than John Ryle, the first professor of social medicine in this country. But I cannot rid my mind of the thought that Ryle got this thing mixed up with his political views, which were markedly socialistic.

The claim staked out by social medicine has always seemed to me to fall well within the ambit of Medicine in the general, indeed in the Hippocratic, sense. "Consideration of the ultimate, as well as the intimate, causes of disease" does not give us a new, but only an extended, pathology. A patient's environmental conditions have in recent times been studied, and their aetiological importance stressed, more fully than formerly. This is good; such knowledge was always pertinent, but it was neglected. The extreme degree of lazy-mindedness in relation to a patient's conditions of life is shown by the doctor who is uncertain of a patient's age, *thinks* she has children but doesn't know how many, and cannot say if she is, or is not, past the menopause. It is just as culpable not to know the sort of atmosphere in which a man works, plays, and sleeps; but to elevate inquiry about these things into a special branch of Medicine is, I opine, redundant. The sphere of the medical officer of health is definite and requisite. So is that of the industrial medical officer. But the doctor should himself be familiar with the routine, the environment, and the habits of his patient if he is to be "guide, philosopher, and friend."

(ii) I would say much the same for the effort to make "psychosomatic medicine" a new concept. If Plato and his associates may be taken as our guides, they made it clear that the function of the physician was not limited to the study of the body of the patient only, but should include his mind also. Plato put significant words into the mouth of Socrates when he said: "There is no cure for the body apart from the mind. First then, and above all, the mind must be treated if the head and rest of the body are ever to be made whole. . . . Just here the mistake is made in regard to men: the attempt to treat the body independently of the mind." And in another place he says: "The part can never be well unless the whole be well." All disease was, to the Greeks, "psychosomatic."

The importance of retaining the environmental and what is quaintly called the "psychogenic" factors in general Medicine rather than segregating them for special study is greater to-day than ever before. This is so largely because the doctor is faced less and less with plagues and epidemics resulting from virulent infections from without, and more and more with disease processes due in the main to troubles within. We have exchanged old diseases for new—typhoid and sepsis for cardiovascular disease and the psychoneuroses. Our "danger" is, indeed, "being human."

All the more reason, as I say, for integrating into one whole the physical, mental, and environmental factors entering into the patient's condition.

Direct Contact of Doctor and Patient

This integration, you will say, needs time and care and expert training. Of course it does. It involves what I have frequently termed a "close-up" between doctor and patient. Any system of medical care which does not make this "close-up" possible must fail, sooner or later, to attain its object. Speaking at the Welsh National Medical School as long ago as 1933, I said that "any increase in organization by which the doctor finds himself better equipped and less subject to wastage of time and effort is to be welcomed. The only inalienable factor, without which no good doctoring can really be accomplished, is the preservation of that direct contact of doctor and patient which experience proves to be essential." Further experience has not changed my view.

I have not myself been favourably impressed by the "new look" which the practice of Medicine in this country has recently worn. The fact that it allows the doctor and the patient to meet so seldom and for so short a time is my main reason for not liking it. Moreover, believing that the greater part of whatever virtue lies in medical care is resident in the personality of the doctor, and seriously doubting if you can nationalize personality as you can gas and electricity and the railways, I never thought a State Medical Service which did not take this basic fact into account was likely to prove a great success

I did believe, strongly, in the State giving every facility to doctors to function in the way I have just now outlined, whether it be in the surgery, in the home, or in hospital. I believed in regionalization (and at the same time rationalization) of the hospital services. I believed in adding the dependants of the workers to the National Insurance Scheme. I believed in making the whole of Medicine available to every citizen. But in my creed it was to be *our* Medicine, not Medicine as conceived by, and purveyed from, the bureau.

The pity of it! A little statesmanship, a little humility, a little consultation, an advance by evolution rather than by revolution, and the "new look" might have been quite attractive. A great opportunity for the time being has been missed; but surely only for the time being.

Well, there are two *clichés* that are apposite to my main theme. Both of them are from the French, and, taken together, they point the moral of most of these remarks. "Le plus ça change . . ." and "Toujours le malade . . ."

The Vocation of Medicine

Few doctors can have seen more changes on the face of Medicine during a lifetime than I have, and I doubt if they will have come to closer grips with their patients. At first blush I might think that when I was at your

stage of my career I was luckier than you are in that I had the ball at my feet and you have not. How foolish! The ball *was* at my feet, and again and again I muffed it. The ball is at *your* feet just as much to-day as it was at mine half a century ago. The ball is the patient.

Don't think because the chemists present us with a new antibiotic every month, and hormone synthesizers never seem to go to bed, that we have got control of all the diseases flesh is heir to. Resistant strains of bacteria mock the antibiotic-monger, and hormone side-effects teach us humility. Cancer still rears its ugly head as a persisting challenge, not less in respect of its essential cause than in the care of the cancer patient. More than this, a "sick headache" and a "common cold" still elude our treatments—or should I say "therapy"? And only the *Readers' Digest* knows all the answers.

Realizing all I do—and I include the jolt that Whitehall, in its ignorance and precipitancy, has given it—would I take up Medicine as a vocation if I were starting again? Certainly I would. It is a good thing that we have committed ourselves to. It presents life to us in full gamut. If we are realists like old Montaigne we "find a ravishing kind of satisfaction in pleasing another and in doing a just action." If we are idealists, let us turn to the reflections of a great clinician, Peter Mere Latham:

"Diseases are not abstractions," he says; "they are modes of acting, different from the natural and healthy modes—modes of disorganizing, modes of suffering, and modes of dying; and there must be a living, moving, sentient body for all this.

"This body must be your study and your continual care—your active, willing, earnest care. Nothing must make you shrink from it. In its weakness and infirmities, in the dishonours of its corruption, you must still value it—still stay by it—to mark its hunger and thirst, its sleeping and waking, its heat and its cold; to hear its complaints, to register its groans.

"And is it possible to feel an interest in all this? Ay, indeed it is; a greater, far greater interest than ever painter or sculptor took in the form and beauties of its health.

"Whence comes this interest? At first perhaps it seldom comes naturally; a mere sense of duty must engender it; and still, for a while, a mere sense of duty must keep it alive. Presently, the quick, curious restless spirit of science enlivens it; and then the deliberate choice of the mind.

"When the interest of attending the sick has reached this point, there arises from it, or has already arisen, a ready discernment of diseases, and a skill in the use of remedies. And the skill may exalt the interest, and the interest may improve the skill, until, in process of time, experience forms the consummate practitioner."

A High Calling

You may think I am taking a very lofty view of the doctor's function in society. I am. I can say with conviction to any one of you: "High is our calling, Friend." And you know the tributes to their doctors paid by Samuel Johnson, Stevenson, Henley, and others? But it is not only the poets who place the doctor's function at a high level. Karl Marx was, in the opinion of many, "of the earth, earthy." Yet no man paid a higher tribute to Medicine and to those who practise Medicine. "For thousands of years," he said, "Medicine has united the aims and aspirations of the best and noblest of mankind. To deprecate its treasures is to discount all human endeavour and achievement as naught."

This thing will go on, of course—*must* go on. And, as I am not one of those who think that "the former days were better than these," I look forward as well as back. I think the wise man was a bit bilious when he apportioned dreams to the old and visions to the young. I dream dreams, it is true, but I also see visions. I see the Science and Art of Medicine, doctoring, the care of the patient, attaining an even higher place in the social economy in the future than it has ever done in the past. Someone has said that the technology of Medicine has outrun its sociology. It will fall to you to make this adjustment, and make it without sacrificing the individuality of the patient who places himself in your hands with such confidence and with such hope.

In all this I know that you King's men and women will continue to pull your weight. Folk fail only "when," to quote the wise man again, "they shall be afraid of that which is high," and this is surely a condition unthinkable at King's.

THE TREATMENT OF CLINICAL PNEUMONIA WITH ANTIBIOTICS

REPORT BY A SUBCOMMITTEE OF THE ANTIBIOTICS CLINICAL TRIALS (NON-TUBERCULOUS) COMMITTEE OF THE MEDICAL RESEARCH COUNCIL*

The introduction of the newer antibiotics, "aureomycin" and chloramphenicol, raised the question whether one of these might not be a better primary treatment for pneumonia than penicillin or the sulphonamides. When a case of pneumonia is first seen the aetiology is not known. It seemed possible that the reported action of aureomycin and chloramphenicol on a wide range of aetiological agents, including certain bacteria, rickettsiae, and viruses not susceptible to penicillin, might make one of the newer drugs a better all-round weapon for the general practitioner. When this trial was initiated it was already known that aureomycin was effective in certain types of pneumonia (Collins *et al.*, 1949; Finland *et al.*, 1949; Olshaker *et al.*, 1949; Woodward, 1949). There was a good deal less information about the use of chloramphenicol in pneumonia (Olshaker *et al.*, 1949; Recinos *et al.*, 1949; Woodward, 1949), but on theoretical grounds it seemed worth trying. The object of the trial was therefore to find out which of the antibiotic drugs was the best one to use when a clinical diagnosis of pneumonia had been made.

Members of the Subcommittee: Dr. J. G. Scadding (Chairman), Professor C. H. Stuart-Harris, Drs. T. Anderson, H. Joules, J. Knowelden, and J. W. Crofton (Secretary).

Clinicians and Pathologists.—Central Middlesex Hospital: Drs. H. Joules, R. S. Francis, and K. P. Ball (Clinicians); J. D. A. Gray (Pathologist) *City General Hospital, Sheffield:* Professor C. H. Stuart-Harris, Drs. C. S. Darke, K. J. Milne, E. G. Rhind, and F. J. Flint (Clinicians); M. Pownall, J. C. Appleby, D. A. Tyrrell, C. P. Beattie, Z. Franks, M. W. A. Gatman, S. Varadi, and L. G. Cook (Pathologists) *Hammersmith Hospital:* Drs. J. G. Scadding, J. W. Crofton, J. W. Fawcett, and D. G. James (Clinicians); W. Hayes, D. A. Mitchison, G. M. Ross, Hilda Boffa, D. R. Barry, M. Millard, and O. G. Jones (Pathologists). *Knightswood Hospital, Glasgow:* Drs. T. Anderson and Alison M. T. Drimmie (Clinicians); N. R. Grist and Joan B. Landsman (Pathologists). *Central Public Health Laboratory, Colindale:* Drs. B. E. Andrews, B P. Marmion, and A. D. Macrae. *Statistical Research Unit, Medical Research Council:* Drs. J. Knowelden and J. T. Boyd.

The trial was carried out by a subcommittee of the Antibiotics Clinical Trials (Non-Tuberculous) Committee of the Medical Research Council. Four centres were established—at Hammersmith Hospital, the Central Middlesex Hospital (both in London), the City General Hospital in Sheffield, and Knightswood Hospital in Glasgow. The trial began at Hammersmith Hospital in February, 1950, and in the other centres in August, 1950. By April, 1951, 267 cases had been admitted and the trial was closed. The present report is concerned only with the primary object of the trial—that is to say, with the results of the different methods of treatment.

Methods

Type of Case.—The series consisted of cases which were diagnosed as pneumonia on admission and were admitted to adult wards, with the exception of (1) patients already convalescent, (2) patients in whom the pneumonia complicated heart failure due to some cause other than the pneumonia, and (3) patients who had already had 6 g. or more of sulphonamides, or any penicillin, before admission. The diagnosis of pneumonia was in the first place a clinical one, and the generally accepted criteria were adopted. In most cases the clinical diagnosis was confirmed by a radiograph soon after admission. In a number of cases the initial diagnosis of pneumonia was proved to be incorrect, and these were later rejected from the series. Twenty-six cases were rejected from the group treated with aureomycin, 22 from that treated with chloramphenicol, and 29 from that treated by "standard" methods.

Treatment Groups.—The cases were admitted to one of the following treatment groups. (1) Aureomycin: Given in an initial dose of 2 g., followed by 1 g. six-hourly until the temperature had been normal for 24 hours. The dose was then lowered to 0.5 g. six-hourly until the physician was satisfied that it was safe to stop giving the drug. For older children admitted to adult wards a dose of 100 mg. per kg. per day was given to those under 40 kg. in weight. (2) Chloramphenicol: Dosage as with aureomycin. (3) "Standard treatment": Penicillin or sulphonamides, alone or in combination, in whatever dosage the physician wished. In fact, only eight cases had sulphonamides alone.

Allotment to Treatment Groups.—For each hospital three series of cards were made up, each containing an equal number bearing the words "aureomycin," "chloramphenicol," or "standard." The cards were put in blank envelopes, placed in random order, and then given serial numbers. When it had been decided on admission that a patient had pneumonia the next envelope was opened, and in this way the treatment group was determined. The physician in charge was of course permitted to change the treatment at any time if he thought it was in the patient's interest to do so.

Investigations.—On admission a specimen of sputum was cultured on blood agar and also injected intraperitoneally into a mouse. Failing sputum, a nasopharyngeal swab was examined. A blood culture was done on admission and a white blood cell count as soon as possible. Specimens of serum for virus studies were obtained on admission, about the fifteenth day of the pneumonia, and, when possible, about the twenty-fifth day. These specimens were tested for cold-agglutinins and for antibodies to the viruses of influenza A and B and of the psittacosis–lymphogranuloma venereum group, to *Rickettsia burneti* (Q fever), and to *Streptococcus MG*.

A radiograph of the chest was taken on admission, or as soon afterwards as possible, and repeated once a week until either it was clear or no further improvement was expected. In patients whose films were not clear on discharge subsequent radiographs were taken at longer intervals.

Criteria for Aetiological Diagnosis.—Standard criteria for aetiological diagnosis were adopted. In outline they were as follows. A specific bacterial pneumonia was diagnosed when pathogenic bacteria were obtained on mouse inoculation, blood culture, culture of the pleural fluid, or from the lung at necropsy. When pneumococci were cultivated from the sputum alone the case was diagnosed as pneumococcal only if the pneumococci belonged to one of the lower-numbered serological types and the diagnosis was consistent with the clinical findings. When *Staphylococcus aureus* (coagulase-positive) or *Streptococcus pyogenes* were predominant in the sputum the pneumonia was regarded as staphylococcal or streptococcal if this was clinically consistent, even when cultures from other sources were negative. The same criteria were adopted for Friedländer's bacillus (*Klebsiella pneumoniae*) and *Haemophilus influenzae*, though in these cases sputum culture alone was accepted only if there had been no previous chemotherapy.

Infection with influenza virus A or B was diagnosed if a fourfold rise in complement-fixing antibody was observed or if a titre of 1/16 or above was obtained. A fourfold rise in the relevant titre was demanded for a diagnosis of psittacosis or Q fever; a single titre of 1/80 or over for psittacosis or 1/128 or over for Q fever would have been carefully investigated, but in fact none occurred. In the case of pneumonia with cold agglutinins either a fourfold rise in titre or a single reading of 1/128 or above was accepted. Agglutinins for *Streptococcus MG* were regarded as significant if there was a fourfold rise in titre under observation or a titre of 1/40 or above was recorded.

The series consisted of 267 cases, in which there were approximately twice as many men as women.

Comparability of Treatment Groups

Table I shows that the different treatment groups were comparable with regard to sex, age, anatomical distribution of the pneumonia, day of illness admitted, temperature on admission, and number of patients who were regarded as desperately ill when they came in. The aetiology of the pneumonia in the various treatment

TABLE I.—*The Comparability of the Groups at the Start of Treatment*

	Aureomycin	Chloramphenicol	Standard
Sex:			
Male	56 (66%)	61 (64%)	56 (65%)
Female	29 (34%)	35 (36%)	30 (35%)
Age:			
Under 60 years	62 (73%)	74 (77%)	65 (76%)
60 years and over	23 (27%)	22 (23%)	21 (24%)
Average age	48·7	45·2	47·1
Anatomical distribution:			
Lobar	56 (66%)	62 (65%)	45 (52%)
Part of one lobe	22 (26%)	25 (26%)	32 (37%)
Bronchopneumonia	7 (8%)	9 (9%)	9 (11%)
Average day of illness at admission	4·6	5·1	5·1
Average temperature on admission (degrees)	100·9	100·7	100·7
Patients desperately ill on admission	5	8	6
Total in Group	85	96	86

TABLE II.—*Aetiology of Pneumonia in Patients*

	Aureomycin	Chloramphenicol	Standard	All Treatments
Pneumococcal* ..	59 (69%)	76 (79%)	61 (71%)	196 (73%)
Staphylococcal ..	1	1	6	8
Streptococcal	0	1	1	2
Friedländer's bacillus	2	1	0	3
Haemophilus influenzae	1	0	0	1
Probably bacterial ..	14 (16%)	12 (13%)	13 (15%)	39 (15%)
Pneumonia with cold haemagglutinins ..	1	2	1	4
Undetermined origin ..	7	3	4	14
Positive titres for influenza A or B (included in groups above)	9 (11%)	22 (23%)	16 (19%)	47 (18%)
Total patients ..	85	96	86	267

* In 37 (19%) of the patients with pneumococcal pneumonia the blood culture was positive; the distribution between the treatment groups was approximately equal.

N.B.—It will be noted that, although the relevant investigations were carried out in all cases, no case was diagnosed as psittacosis or Q fever. No case had significant agglutinin titres to *Str. MG* in the absence of raised cold agglutinins or of some specific aetiological agent.

groups is given in Table II. It is not the purpose of this paper to discuss the aetiology of pneumonia. As already mentioned, uniform criteria were used, but where more than one agent was identified the case is classified under the agent thought to predominate. The cases labelled "probably bacterial" usually had a leucocytosis and were clinically consistent with a bacterial pneumonia. Where serum titres indicated infection with influenza virus there was usually evidence of a bacterial pneumonia complicating the influenza.

It will be seen that the treatment groups are reasonably comparable with regard to aetiology, though there are rather more cases of influenza among the chloramphenicol group and of staphylococcal pneumonia among the standard group. It is interesting that 73% of the cases were pneumococcal.

Results of Treatment

When the temperature had been under 99° F. (37.2° C.) on a four-hourly temperature chart for 24 hours, it was regarded as normal. Physical signs in the chest were regarded as having cleared when either (1) there were no residual physical signs, or (2) in a patient with chronic bronchitis the chest was clear except for signs of bronchitis which were known or estimated to have been previously present, or (3) any residual physical signs were thought to be due to thickened pleura. The chest radiograph was regarded as clear when either (1) it had become normal, or (2) the abnormalities were only those of emphysema, bronchiectasis, or other changes which were known or estimated to have been previously present, or (3) the residual abnormalities were those of thickened pleura.

Table III shows that all three methods of treatment gave similar results as judged by the time taken for the temperature to fall, for the physical signs to disappear, for the radiograph to become clear, and for the patient to get up and to be discharged. The numbers of deaths and relapses were very similar in each treatment group, as were the numbers of cases in which it was thought necessary to change the treatment.

TABLE III.—*Results of Treatment*

	Aureomycin	Chloramphenicol	Standard
Total in group	85	96	86
Deaths (No. of cases)	7	7	5
Relapses (No. of cases)	8	3	4
Change of drug or addition to treatment (No. of cases)	5	8	3
No. of patients "failing" on specified treatment (i.e., appearing in one or more of the above categories) ..	15	14	12
Temperature:*			
No. with normal temperature after			
3 days of treatment	39 (52%)	52 (61%)	37 (47%)
6 days of treatment	56 (75%)	74 (87%)	56 (72%)
Median day on which temp. became normal	2·9	2·7	3·3
Physical signs clear:*†			
No. with physical signs clear after			
15 days of treatment	37 (50%)	47 (56%)	43 (55%)
25 days of treatment	57 (77%)	62 (74%)	62 (79%)
Median day on which physical signs became normal	15·0	14·1	13·8
Radiograph:*†			
Percentage of cases with clear radiograph at			
3 weeks after admission ..	34 (46%)	40 (48%)	36 (47%)
6 weeks after admission ..	55 (77%)	69 (84%)	59 (79%)
Day patient up:*†			
No. allowed up after			
10 days of treatment	33 (45%)	38 (45%)	29 (39%)
20 days of treatment	64 (88%)	76 (90%)	67 (89%)
Median day on which patients first allowed up	10·8	10·7	11·5
Day patient discharged:*			
No. discharged after			
20 days of treatment	38 (51%)	45 (53%)	38 (49%)
30 days of treatment	58 (77%)	72 (85%)	63 (81%)
Median day on which patient was discharged	19·9	19·5	20·3
*Records for the following patients were not included in these items			
Deaths	7	7	5
Change of treatment	3	4	3
†Information on these items was not recorded for the following patients			
Patient up	2	1	3
Physical signs clear	1	1	—
Radiograph (3rd week) ..	1	2	1
„ (6th week) ..	4	3	3

Desperately Ill Patients

On admission a patient was designated "desperately ill" if he seemed likely to die within 24 hours. There were 19 such patients—7 aged 40 to 60, 12 aged 60 or over. It is of interest that all except three patients were chronic bronchitics; one of the exceptions was too ill to give a history, so that only two patients were definitely known not to have chronic bronchitis. The incidence of chronic bronchitis in those admitted desperately ill is therefore at least 84%, as compared with 53% in the remaining patients. The difference is statistically significant ($\chi^2 = 5.66$, $P = <0.01$). Fourteen out of the 19 patients had pneumococcal pneumonia. In the rest the pneumonia was "probably bacterial." The distribution was lobar in all except three, but in most of those over 60 there were signs of bronchitis in addition to those of lobar pneumonia. In only one was there serological evidence of an additional influenzal infection.

Six cases were treated with penicillin, and four of these recovered. One of those who died had only one intramuscular dose and thereafter was treated orally. There were no changes of treatment in this group. Of the five cases initially treated with other drugs who were later given penicillin, only one recovered. Eight cases were treated with chloramphenicol. In three there was no change in treatment, and only one recovered. In five others treatment was changed to penicillin, in two cases because of inability to retain the chloramphenicol; only one of these five cases recovered. So there were only two recoveries out of the eight cases initially treated with chloramphenicol. Five cases were treated with aureomycin; three of these recovered and two died; there was no change of treatment.

The differences between the treatment groups are not statistically significant. So far as the figures go they suggest that penicillin is at least as good as the other

antibiotics for the desperately ill case of pneumonia, though the series included no case of the fulminating staphylococcal and influenzal pneumonia in which penicillin has had little success. Only one patient was given intravenous aureomycin; he recovered, but he had been admitted on the twelfth day of a Type V pneumococcal pneumonia, and was the only desperately ill patient in whom there was no history of chronic bronchitis.

Complications

Complications of pneumonia occurring after treatment had been begun are shown in Table IV. Although there were fewer complications in those on standard treatment,

TABLE IV.—*Complications of Pneumonia Occurring under Treatment*

	Aureomycin	Chloramphenicol	Standard
Sterile pleural effusion	4	3	2
Empyema	2*	0	1
Lung abscess	1*	1	0
Pneumothorax	0	1	0
Cardiac failure	1	2	0
Arthritis	1	0	1
	9*	7	4

*One patient had a lung abscess and an empyema and is listed under both headings.

the figures are too small for the difference to be necessarily of significance. Thrombosis of leg veins occurred in two cases on aureomycin and two on standard treatment, and cerebral thrombosis in a patient treated with aureomycin. These complications have been omitted from the table as being a result of rest in bed rather than of pneumonia.

Deaths

Analysis of the treatment groups does not indicate a preponderant failure of any particular antibiotic, though in the group treated with penicillin perhaps there was an undue proportion treated with penicillin by mouth.

There were 19 deaths—7 in patients under 60 years of age and 12 in patients 60 or over. All except two were chronic bronchitics, and one of these two had had bronchitis for two months before the onset of the pneumonia. In 11 cases the pneumonia was pneumococcal, in two due to Friedländer's bacillus, both with complicating factors, and in the remaining six "probably bacterial." Ten of the 19 cases were desperately ill on admission, and nine patients died within 24 hours of admission.

There were seven deaths in patients treated initially with aureomycin, seven in those treated with chloramphenicol, and five in those treated with penicillin; in four of the latter the drug was mainly given by the mouth. The four deaths on oral penicillin occurred among 22 patients treated by this method, whereas there was only one death among the remaining 64 patients treated by "standard" methods. But the penicillin dosage in those treated orally and parenterally was not entirely comparable, so that too much emphasis should not be laid on the different mortality in the two groups. In two of those treated with aureomycin, and in four of those treated with chloramphenicol, penicillin or streptomycin was later substituted without effect. There were no significant differences between the numbers of those dying within 24 hours of admission in the three groups.

Toxicity

Table V indicates that toxic effects of the drug were much more frequent in those treated with aureomycin (32%) and chloramphenicol (22%) than in those treated

TABLE V.—*Drug Toxicity*

	Aureomycin	Chloramphenicol	Standard
Total patients in treatment group	85	96	86
Total patients with symptoms of toxicity	27 (31·8%)	21 (21·9%)	5 (5·8%)
Nausea — Mild	10	2	0
Nausea — Severe	1	0	0
Vomiting — Mild	6	1	0
Vomiting — Severe	1	1	0
Diarrhoea — Mild	7	5	0
Diarrhoea — Severe	0	0	0
Rashes	4	2	1
Red or sore mouth or tongue	5	9	4
Black tongue	2	2	0
Scrotal irritation	1	0	0
Vaginitis	0	1	0
Drug fever	2	0	0
Mental symptoms	0	4	0

with penicillin or sulphonamides (6%). Nausea and vomiting were most troublesome in those on aureomycin; 12 patients (about 14%) complained of either nausea or vomiting, or both, but in most it was mild. Diarrhoea caused little trouble. Oral symptoms occurred in a small proportion of cases in all treatment groups. Scrotal irritation or vaginitis was rare. Mental symptoms were noted in four patients treated with chloramphenicol; in two they consisted of mild depression, in one of a "dazed feeling," and in the fourth—a girl of 9 treated with adult doses—of confusion which came on after subsidence of the temperature and which cleared up rapidly on stopping the drug.

Expense

As we have found so little difference in the results of treating pneumonia with penicillin, aureomycin, or chloramphenicol, we have thought it of interest to work out the average cost in those patients who completed their course of treatment, taking as a basis prices current in September, 1951, and comparing aqueous penicillin, which was mainly used, with the other two drugs. The average total doses, in round figures, were 26 g. of aureomycin, 23 g. of chloramphenicol, and 7 million units of penicillin, costing £10 1s. 6d., £8 15s. 11d., and 18s. 11½d. respectively. So that, compared with penicillin, it is on an average 10½ times as expensive to treat a patient with aureomycin and over 9 times as expensive to treat him with chloramphenicol.

Discussion

The patients included in this series are those in whom a clinical diagnosis of pneumonia was made in the first place. The small proportion of cases of probable virus origin is due to the fact that many of these are admitted with pyrexial rather than respiratory symptoms. But it is the case of clinical pneumonia that is important to the practitioner when choosing his drug for treatment, and it is significant that in our series some 73% were pneumococcal and many of the rest bacterial. The high proportion of pneumococci recovered may well reflect the special measures taken to isolate them.

The general conclusion must be that for the case of clinical pneumonia penicillin is at least as good as aureomycin or chloramphenicol. There are some indications that it may even be better. There were slightly fewer

deaths in patients on penicillin, and in four out of five of these the penicillin had been given by the mouth. Whether oral penicillin is as effective as intramuscular is under investigation at the Glasgow centre, and will be the subject of a later independent report. But we are permitted to state here that the Glasgow workers do not advise the oral administration of penicillin as the sole method of treatment of pneumonia. Four of six desperately ill patients treated with penicillin recovered, and one of those who died had been treated orally. The figures are, of course, too small for definite conclusions to be drawn, but only two out of eight treated with chloramphenicol and three out of five treated with aureomycin survived. It is also to the advantage of penicillin that toxic reactions were less frequent than with the other drugs, though this may be partly outweighed by the necessity for intramuscular injections.

In addition to its other advantages penicillin is very much cheaper. A comparison of the cost has shown that penicillin cures a case of pneumonia at less than a ninth of the cost of chloramphenicol and less than a tenth of the cost of aureomycin. But it must be admitted that lower doses of chloramphenicol and aureomycin might have been effective (Kirby *et al.*, 1951).

In conclusion, therefore, in a choice between aureomycin, chloramphenicol, and penicillin, it seems proper to recommend penicillin by injection as the initial treatment of clinical pneumonia. Only eight cases in the series were treated with sulphonamides alone, so that no comparison of their value can be made, though Anderson (1948) has shown that the results in pneumococcal pneumonia are as good as those with penicillin. Aureomycin and chloramphenicol, or streptomycin, should be reserved for those patients who fail to respond to penicillin or in whom a penicillin-resistant organism is isolated. In desperately ill patients it may well be justifiable to use more than one drug, but it is probable that at least one of these should be given in large doses by injection.

Summary

A trial of aureomycin and chloramphenicol in clinical pneumonia has been carried out at four centres—two in London, one in Sheffield, and one in Glasgow.

Cases diagnosed as pneumonia on admission were allotted at random to one of three treatment groups: (1) aureomycin; (2) chloramphenicol; and (3) "standard treatment." Most of those in the last group were treated with penicillin, a few with sulphonamides.

There were 267 cases in the series. The treatment groups were found to be comparable, and the results of treatment were very similar in each group.

Analysis of the patients who were desperately ill on admission, and of the deaths, suggests that penicillin was at least as valuable as the other two antibiotics.

Symptoms of drug toxicity were much commoner with aureomycin and chloramphenicol than with penicillin.

As compared with penicillin, treatment with aureomycin was more than ten times as expensive and with chloramphenicol more than nine times.

In a choice between aureomycin, chloramphenicol, and penicillin, it is suggested that penicillin by injection is the best treatment for clinical pneumonia. But in this recommendation no account is taken of the possible value of the sulphonamides, which were not compared with the other drugs in the present trial.

We wish to record our gratitude to our colleagues who have allowed us to investigate patients under their care, and to the nursing staff and laboratory technicians who have contributed so much to the work of the trial.

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AUREOMYCIN IN THE TREATMENT OF PNEUMONIA

BY

MARGARET B. EADIE, M.B., Ch.B.

NORMAN R. GRIST, M.B., B.Sc., M.R.C.P.Ed.*

AND

JOAN B. LANDSMAN, M.B., F.R.F.P.S.*

(From Knightswood Hospital and the University of Glasgow)

In considering how best to treat a case of pneumonia the practitioner has nowadays a choice of therapeutic agents. The sulphonamides are easily administered, and although their spectrum of activity is rather narrow they provide an adequate and effective method of treatment for most cases. Penicillin, because of its freedom from toxicity, is particularly valuable if there is impairment of cardiac, renal, or haemopoietic function, and for that reason may be preferred in the treatment of the older patient (Anderson and Ferguson, 1945). Although intramuscular injection constitutes a disadvantage, the demonstration that treatment may be effectively carried out when the space between injections is prolonged to 12 or even 24 hours makes such a method practicable even in the patient's home. Furthermore, it has been shown that, even in the adult, oral administration of penicillin is adequate provided the dose is large enough (Anderson and Landsman, 1947).

The newer antibiotics, "aureomycin" and chloramphenicol, have been shown to be effective agents in pneumococcal pneumonia (Collins, Paine, and Finland, 1948a), and in view of their wide range of antibacterial activity there has been a tendency to regard them as the best form of treatment. As there is no proof that these materials are in fact better than sulphonamides or penicillin, it seems worth while to report a study in which the effect of aureomycin was compared with that of orally administered penicillin. The choice of the latter method as a standard for comparison was intentional, since it seemed desirable to use an oral preparation for both groups of cases. The trial was carried out during the winter season of 1949–50.

Material and Methods

The patients were selected for the trial on the grounds that they had received either inadequate or no chemotherapy prior to admission. Apart from this fact, there was no other selective criterion, and the cases constituted the ordinary routine admissions to the pneumonia

*These workers were in receipt of a grant from the Medical Research Council during the period of the trial.

ward. The clinical, radiological, and bacteriological examinations were similar to those conducted in previous trials at this centre. Patients were allocated, in the order of their admission, alternately to the two treatment groups. The first group (40 patients) were given aureomycin; an initial dose of 1 g. was followed by 0.5 g. every six hours for a period of three to five days. This group contained one patient (not originally entered in the trial because of treatment before admission) who failed to respond to an adequate dose of penicillin administered intramuscularly for five days.

The second group (39 patients) received penicillin orally; after an initial dose of 80,000–100,000 units treatment was continued with a dose of 20,000–60,000 units three-hourly. Four patients in this group were at some time given intramuscular injections of penicillin. The serious state of one patient (who died 36 hours after admission) alarmed the admitting resident, who decided later to give penicillin intramuscularly. Two patients developed pleural effusions and were given, at that time, penicillin both intrapleurally and intramuscularly. The fourth patient failed to respond after three days of oral treatment, but recovered when the route of administration was altered. The total dose of aureomycin ranged from 7 to 10 g. and of penicillin from 1,500,000 to 3,000,000 units.

Results

Certain factors are accepted as having an important influence on the outcome of a pneumonia, whether due to pneumococcal or other bacterial infection, and in Table I the two groups of cases are compared in respect of these factors.

The two treatment groups are comparable in respect of these various factors, although in the penicillin group there is a slight excess of the oldest age group, and more of the patients had been ill for longer than four days than in the aureomycin-treated group. In the present series, 40.5% of the total cases had received chemotherapy prior to admission, a figure little different from those obtained in the two earlier series (42.8 and 52% respectively).

TABLE I.—*Comparison of the Two Treatment Groups*

Prognostic Factors	Number of Cases	
	Oral Penicillin	Aureomycin
Age distribution:		
16–20 years	1	3
21–40 ,,	10	13
41–60 ,,	17	19
61+ ,,	11	5
All ages	39	40
Duration of illness on admission:		
0–2 days	8	13
3–4 ,,	10	17
5+ ,,	21	10
Mean duration	4·2	3·4
Treatment prior to admission:		
Sulphonamide	10	15
Penicillin	3	1
Sulphonamide + penicillin	2	1
Percentage of group treated	38·5	42·5
Bacteriology:		
Pneumococcus type 1	2	6 (1)‡
,, ,, 2	6 (1)*	10 (1)
,, ,, 3	4 (1)†	3
,, Group 4	15 (1 : Type 8)	7 (1 : Type 18)§
Total pneumococcal cases	27	26
Extent of consolidation (average No. of lobes)	1·3‖	1·25

The figures in parentheses refer to bacteriaemic cases.

* Pour plate: 3 colonies per ml.
† Pour plate: uncountable colonies.
‡ Pour plate: 12 colonies per ml.
§ Pour plate: 2 colonies per ml.
‖ In this analysis there are four exclusions: two patients had a broncho-pneumonic type of illness; in a third the diagnosis of influenza was made; and in another death occurred before a radiograph could be taken.

Consideration of the bacteriological findings indicates that a smaller proportion of the patients now admitted to hospital with pneumonia have a positive blood culture, for in only six cases were pathogenic organisms isolated—a bacteriaemia rate of 7.6%. Comparable figures in previous investigations were 17.4 and 20% respectively. The reason for the fall in the bacteriaemia rate is not at once apparent. An increase in the administration of treatment before admission to hospital, which would reduce the incidence of this complication, was not found, and indeed the patients were selected in view of the inadequacy of such chemotherapy. Clinical impressions did not suggest that the degree of illness in these patients was less severe than that seen in other years since sulphonamides and penicillin were introduced.

It will be observed from Table I that in 53 of the 79 cases treated a pneumococcus was isolated from the sputum or blood. In 16 cases culture of the sputum showed a mixed flora of a normal character, and in the remaining 10 patients this examination could not be made. The distribution of pneumococcal types requires no comment, but it will be observed that a high proportion of type 2 infections continues to be a feature of pneumonia in Glasgow.

The duration of fever, development of complications, and number of deaths have been taken as criteria of the results of therapy. The duration of primary pyrexia after starting treatment averaged 42 hours in the aureomycin group and 44.6 hours in those given penicillin orally. In this respect, therefore, there was no difference between the two methods of treatment. Clinical details of two cases are given.

Case 1

A man aged 43 was admitted on May 11, 1950, in the third day of illness. A history was given of the sudden onset of headache and rigors, with vomiting on one occasion. He complained of slight tightness in the chest but no pain or cough. No treatment had been given before admission. He had had chest trouble two years previously, and had been followed up at a clinic for three months and then dismissed.

On admission his temperature was 100° F. (37.8° C.), pulse rate 102, and respirations 26 (Fig. 1). He was fairly sharply ill; his tongue was dry and coated. Examination of the chest revealed pneumonic consolidation of the left lower lobe and numerous fine rales over the right base. *X*-ray examination showed consolidation in the left mid-zone and lower zone. Blood culture was positive, pneumococcus type 1; pour plate, 12 colonies per ml. Sputum culture revealed pneumococcus type 1. White blood cells numbered 23,600 per c.mm. Aureomycin, 1 g., then 0.5 g. six-hourly, was given orally for 72 hours; total, 6.5 g. His temperature settled in 48 hours, with an improvement in his appearance, but the signs in the chest were unchanged. Resolution occurred slowly. He was discharged on May 29. When he reported back on June 23 his *x*-ray film was clear.

Case 2

This patient, a man aged 40, was admitted on December 1, 1949. On November 28 he complained of shivering, weakness, pain in the right chest, and slight unproductive cough. He had no chemotherapy before admission.

On admission his temperature was 103° F. (39.4° C.), pulse rate 116, and respirations 26 (Fig. 2). He appeared rather ill, with dry, coated tongue. Clinical examination showed consolidation of the right lower lobe, and this was

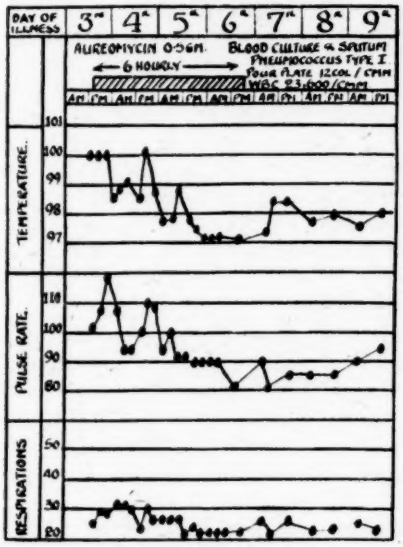

FIG. 1.—Chart of Case 1.

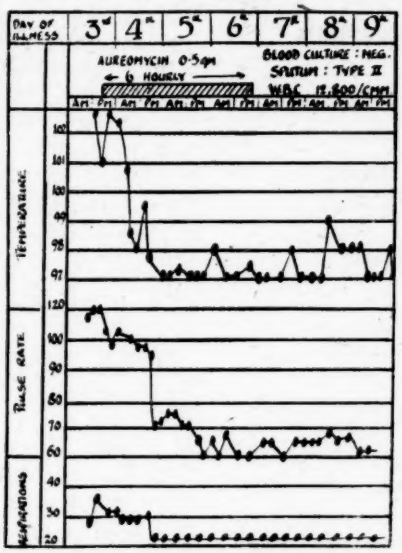

FIG. 2.—Chart of Case 2.

confirmed radiologically. Blood culture was sterile. Sputum culture revealed a pneumococcus type 2. White blood cells numbered 12,800 per c.mm. Treatment similar to that of Case 1 was given. The next day his temperature had fallen and his general condition had greatly improved. Convalescence was uneventful, and he was discharged on December 15.

Complications

Complications developed in 12 of the aureomycin group and in 13 of the penicillin-treated group. None was of a serious nature.

TABLE II.—*Complications*

Complication	Oral Penicillin	Aureomycin
Delayed resolution	10 cases	8 cases
Sterile effusion	2 ,,	4 ,,
Empyema	1 case	—

There were 5 deaths among the 79 patients comprising the two treatment groups—a fatality rate of 6.3% (Table III). Four of the deaths occurred among the penicillin-treated cases, and one patient who received a full course of aureomycin died. All of the patients were in the older age groups, and in three of them the consolidation was extensive; cardiovascular complications were present in each instance.

Discussion

Comparison between the two treatment groups does not support the view that aureomycin represents a better form of chemotherapy for the average case of pneumonia. Perusal of the deaths shows that one important contributing factor was the presence of cardiovascular disease or degeneration. In such cases it is often true to say that chemotherapy may deal successfully with the pneumonic infection but that toxaemia and mechanical stress are too much for an already inefficient cardiovascular system. In such events the only possibility of further improvement in the results of treatment would seem to depend upon the earlier subjection of the bacterial infection. For this reason the need for early and adequate treatment of a pulmonary infection in any patient over the age of 50 should be emphasized. In such patients initial oral treatment with penicillin would seem to be undesirable in view of personal variation in its absorption from the gastro-intestinal tract, which makes it impossible to ensure that an adequate concentration in the blood will be reached or maintained. Treatment should be begun parenterally and a change to oral treatment made only when the infection is obviously under control.

In view of the approach of another winter season with its resulting increase in pneumonic infections, it seems desirable to emphasize that sulphonamides or penicillin will provide adequate chemotherapy.

Summary

A total of 79 patients suffering from pneumonia were included in a comparative trial of aureomycin and penicillin, both given by mouth.

The two groups of cases were comparable in respect of such prognostic factors as age, duration of illness on admission, and bacteriaemia.

The results suggest that aureomycin is no more effective than penicillin for the average case. Four of the five deaths occurred in patients in whom cardiovascular complications were present, and it is suggested that for such patients early treatment, preferably by parenteral routes, is desirable.

We are indebted to Dr. T. Anderson, under whose direction these cases were treated, for his advice in the preparation of this paper.

TABLE III.—*Details of Deaths*

Case	Age	Treatment	Duration of Illness on Admission	Extent of Consolidation	Bacteriology	Comments
A	52	Oral penicillin	6 days	Bronchopneumonia	Sputum: pneumococcus type 3	Congestive cardiac failure on admission
B	58	Oral penicillin for 18 hours, then intramuscular penicillin for 18 hours	5 ,,	$L_1 + L_2$ and R. base	Blood culture: pneumococcus type 3. Pour-plate: uncountable colonies	Severe circulatory failure. Died in 36 hours
C	69	Oral penicillin	6 ,,	,, ,, ,,	Sputum: pneumococcus type 8	Auricular fibrillation. Died in 15 hours
D	75	,, ,,	6 ,,	R_3	No pneumococcus	Pleural effusion; hypertension
E	62	Aureomycin for 6 days. Intramuscular penicillin for 4 days before death (on 19th day of illness)	7 ,,	$R_1 + R_2 + R_3$	Sputum: pneumococcus type 2	Auricular fibrillation; alcoholism

L_1 and L_2, etc., = left upper and lower lobes.

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PNEUMONIA IN WEST LONDON, 1949-1950

BY

J. W. CROFTON, M.D., F.R.C.P.

J. W. FAWCETT, M.B., M.R.C.P.

D. G. JAMES, M.B., M.R.C.P.

AND

J. G. SCADDING, M.D., F.R.C.P.

(From the Postgraduate Medical School of London)

A. D. MACRAE, M.B.

AND

B. P. MARMION, M.D.

(From the Central Public Health Laboratory, Colindale)

In the autumn of 1949 a study of the "pneumonias" admitted to Hammersmith Hospital, London, was begun. It was designed to determine in as many cases as possible the specific aetiological groups to which they could be assigned, and thus to enable the clinical pictures of the groups so defined to be compared. Virus investigations were undertaken at the Central Public Health Laboratory; details of the methods will be published elsewhere. Other pathological investigations were carried out in the Department of Pathology, Postgraduate Medical School of London. In the latter part of 1950 a therapeutic trial of antibiotics in pneumonia, under the auspices of the Medical Research Council (see p. 1361 of this issue), was begun at this and other hospitals and was added to the aetiological study already in being. The present paper, however, is concerned only with the aetiological and clinical studies of the first year of the investigations.

The year covered by this investigation presented a few features of interest in relation to the incidence of pneumonias. There was a prolonged fine autumn in 1949 which led to a delay in the seasonal winter increase in pneumonia incidence. In the early months of 1950 there was an outbreak of influenza B; no influenza A was recorded in our area. The total number of cases of pneumonia treated in the hospital during the year was similar to that of previous years.

Material.—The survey covered the period from October 1, 1949, to September 30, 1950, and included all cases which were diagnosed as pneumonia in the general medical wards. The only exceptions were those in which the pneumonia was thought to be secondary to cardiac failure or was subsequently proved to be due to carcinoma of the bronchus (six cases). The patients were treated by accepted methods, as outlined by one of us (Scadding, 1949).

Methods

A full history was taken on admission, including inquiry into contact with birds and possible sources of Q fever, such as farm animals or their products. Sputum or, failing sputum, a nasopharyngeal swab, was obtained for culture aerobically on blood agar before chemotherapy was begun. From August, 1950, sputum was also injected intraperitoneally into mice for isolation of pneumococci. A white blood count was done, and blood was taken for culture and for serology. A radiograph of the chest was obtained as soon as possible after admission, and usually repeated at weekly intervals. From a number of cases sputum, garglings, or necropsy material were preserved at about −70° C. for later virus studies if indicated.

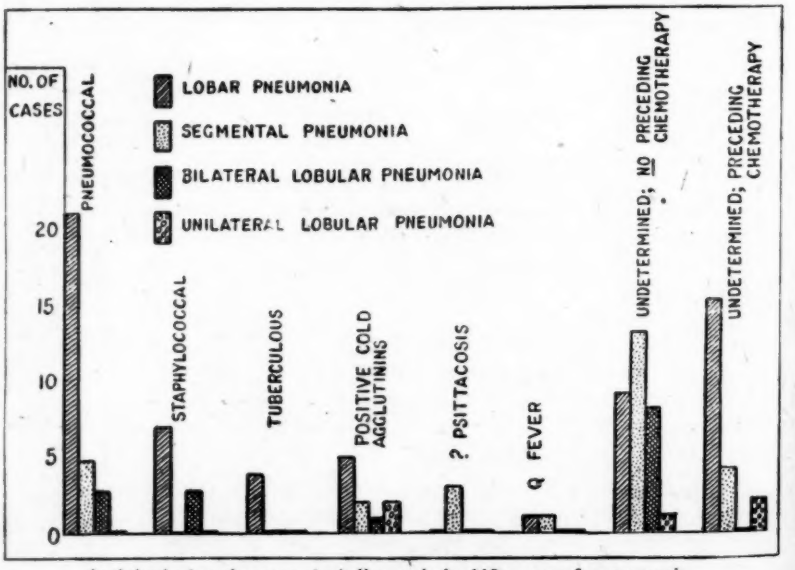
As soon as possible after admission the blood serum was examined for cold haemagglutinins and for immune bodies to *Streptococcus MG*, influenza viruses A and B, *Rickettsia burneti* (Q fever), and the psittacosis group of viruses. These examinations were repeated between the 10th and 14th and between the 14th and 21st days after the onset of the illness.

A total of 110 cases was included in the series. Their ages ranged from 8 to 86 years (mean 45.5, median 45) There were 61 males and 49 females.

In all cases we tried to make both an anatomical and an aetiological diagnosis. The results are summarized in Table I and the Chart.

TABLE I.—*Aetiological and Anatomical Diagnosis in 110 Cases of Pneumonia*

	Pneumococcal	Staphylococcal	Tuberculous	Cold Agglutinins >1:64	? Psittacosis	Q Fever	No Aetiology Determined: No Chemotherapy before Admission	No Aetiology Determined: Chemotherapy before Admission	Total
Lobar	21	7	4	5	0	1	9	15	62
Influenza B	3	2	0	0	0	0	0	1	6
Segmental	5	0	0	2	3	1	13	4	28
Influenza B	0	0	0	0	0	0	4	0	4
Lobular	3	3	0	3	0	0	9	2	20
Unilateral	0	0	0	2	0	0	1	2	5
Bilateral	3	3	0	1	0	0	8	0	15
Influenza B	0	0	0	0	0	0	0	1	1
Totals	29	10	4	10	3	2	31	21	110
Influenza B	3	2	0	0	0	0	4	2	11



Aetiological and anatomical diagnosis in 110 cases of pneumonia.

Anatomical Diagnosis

Definitions.—The anatomical diagnosis, defining the distribution of the pneumonia, was made mainly on radiographic evidence obtained as soon after admission as possible. The cases were divided into three main groups—lobar pneumonia, lobular pneumonia, and segmental pneumonia. The term "lobar pneumonia" was used when the pneumonic process occupied the whole of one lobe. Lobular pneumonia was used to indicate a pneumonia producing a patchy opacity on the radiograph, which might be in one or both lungs; it was preferred as an anatomical diagnosis to "bronchopneumonia," as the latter term carried certain aetiological implications. Cases in which the radiographic opacity was uniform rather than mottled, but which occupied less than a complete lobe, were called "segmental pneumonia." In many of these a lateral radiograph indicated that the lesion did in fact correspond to one or more of the anatomical segments of the lung, but in others it was not possible to obtain a lateral film early in the illness and a segmental lesion was assumed on the strength of the appearances on the postero-anterior film. Although the anatomical categories may have been determined partly by the stage of the disease at which the patient was first examined, in practice it was very rarely that the radiographic appearance changed before the stage of resolution sufficiently to alter the anatomical category.

Results.—Of the 110 cases, 62 were lobar in distribution. In fact, the pneumonia was lobar in a high proportion of cases, whether bacterial or non-bacterial. The 28 segmental pneumonias were distributed through all aetiological groups, with the exception of staphylococcal and tuberculous. These exceptions are probably fortuitous; segmental lesions are certainly seen both in pulmonary tuberculosis and in staphylococcal pneumonia. In 11 of the 20 cases of lobular pneumonia no aetiological agent was identified; pneumococci and staphylococci were each isolated from three and a significant titre of cold agglutinins was found in three. There was a contrast in age distribution between the lobular and the segmental pneumonias. Among the 20 patients with lobular pneumonia all except three were over 40 years of age, and 15 were over 50. The three exceptions consisted of one patient with fulminating staphylococcal pneumonia and two with significant titres of cold agglutinins. On the other hand, all except 9 of the 28 patients with segmental pneumonia were under 40.

Aetiological Diagnosis

Some preliminary explanation of the principles on which cases were classified in the various aetiological groups is required; more detailed consideration will be given below to each group individually. In general, the diagnosis of bacterial pneumonias depended upon the combination of a compatible clinical picture with isolation of the organism from sputum, blood culture, or the lung post mortem. The diagnosis of virus and rickettsial pneumonias, and of influenzal infection, depended upon serological reactions, either specific (psittacosis group, Q fever, influenza), or non-specific (cold agglutinins, *Str. MG* agglutination), and was thus always retrospective; in no case was a virus isolated. The large group classified as of indeterminate aetiology consists of all cases in which no positive evidence of aetiology was obtained; probably it includes some cases which really belong to one of the already mentioned groups, but in which the methods used failed to indicate the aetiology.

In Table I the cases in which there was evidence of influenzal infection are tabulated horizontally, rather than vertically, like those of the psittacosis, Q fever, and "cold-agglutinin-positive" groups, because it is well recognized that the influenzal pneumonias of man, even those of the fulminating type, are due to mixed influenzal and bacterial infections (Scadding, 1937).

Pneumococcal Pneumonia

There was laboratory evidence that pneumococci were responsible for the pneumonia in 29 cases. It is probable that this is an underestimate, as mouse inoculation was employed only in the last two months of the survey. The organism was isolated from the sputum in 28 out of the 29 cases, and from the blood culture alone in the remaining case. Typing sera were not at first available, so that few comments can be made on incidence of the different types of pneumonia. Blood culture was done in 21 cases and was positive in 11.

In 21 of the pneumococcal cases the distribution was lobar, in five it was segmental and in three lobular. There is therefore a clear bias towards a lobar distribution. Blood culture was done in 14 of these lobar cases and was positive in nine.

Clinically the pneumococcal lobar pneumonias did not differ significantly from the classical description, although most of them were cut short by chemotherapy. Two-thirds were of sudden onset and just under half had an initial rigor. Over half had rusty sputum. In all the percussion note was impaired over a lobe and in nearly all there was bronchial breathing. Only 3 out of 21 had white blood cell counts under 10,000 per c.mm., and two of these had had chemotherapy before admission. Three had serological evidence of preceding influenza B infection. They did not seem particularly severe; one of them responded rather slowly to chemotherapy but had a large pleural effusion in addition to the pneumonia.

Five of the pneumococcal pneumonias were segmental in distribution. They occurred at all ages. One of the patients had a preceding upper respiratory infection and two had chronic bronchitis. Three had initial rigors, one had rusty sputum, and the blood culture was positive in two out of the four cases in which it was done. The white blood cell count was over 10,000 per c.mm. in all cases and over 20,000 in two. These facts would suggest that the organism was normally virulent. Three of the patients were afebrile on admission, or became so without chemotherapy, and in the other two the fever subsided on the first and second days after starting chemotherapy.

The three pneumococcal lobular pneumonias did not appear to differ from other cases of similar distribution. In two of them there was a profuse growth of pneumococci from the sputum; in the third the pneumococci were scanty. All had negative blood cultures.

Staphylococcal Pneumonias

Ten cases of pneumonia were ascribed to coagulase-positive *Staphylococcus aureus.* Seven were lobar in distribution, with one death. The remaining three were lobular and all three were fatal. Staphylococci were isolated from the sputum in 8 of the 10 cases, and from the lung post mortem in the other two. They were

penicillin-sensitive in five cases, penicillin-resistant in two, partly penicillin-resistant in one, and not tested in two. In one of the patients with a resistant strain the temperature subsided rapidly while under treatment with penicillin, though the physical and radiographic signs cleared very slowly. The other patient with a resistant strain and the one with a partly resistant strain both died.

It was of interest to determine whether the staphylococci causing pneumonia in this series belonged to related strains. Phage typing of the staphylococci was kindly carried out by Dr. R. E. O. Williams, of the Central Public Health Laboratories. The penicillin-sensitive staphylococci were of assorted types. The two highly resistant staphylococci were related (47/47B/53 and 47/47B/53/54+). The partly resistant strain was not typed. Further details of these studies will be published by Dr. Williams and his colleagues.

Two of the patients with staphylococcal lobar pneumonia had serological evidence of preceding influenza B; neither was very ill and both made a satisfactory recovery.

Clinically there was nothing particularly characteristic of the group except the high mortality, which will be discussed later. Several patients had preceding upper respiratory infections or bronchitis, and in most cases the onset was gradual. Five out of the seven patients with lobar consolidation had rusty sputum, but in only three was bronchial breathing heard. In most of those who recovered the fever subsided rapidly, but in the older patients radiographic clearance was much delayed. In no case was there evidence during life or at necropsy of gross abscess formation.

Apart from the 10 cases in which the staphylococcus appeared to be the dominating agent, there were several in which staphylococci were isolated in addition to other important organisms. Two patients were admitted with an acute pneumonia, and staphylococci were isolated from the sputum; but tubercle bacilli were also found and pulmonary tuberculosis became the dominating condition. In both it seemed probable that the staphylococcal pneumonia was responsible for lighting up a latent tuberculous infection, but the cases have been classified as tuberculous pneumonia.

In two other cases both staphylococci and pneumococci were isolated from the sputum, but the blood culture grew pneumococci only. These cases have been grouped with the pneumococcal pneumonias.

In one other case there was a minor growth of *Staph. aureus* from the sputum; but there was no response to penicillin, a good response to "aureomycin," and the serum later showed a high titre of cold agglutinins. This case has been classified in the "cold-agglutinin-positive" group.

Tuberculous Pneumonias

Tubercle bacilli were isolated from the sputum of four patients. Two of these cases have been discussed above. They presented as staphylococcal pneumonias; the temperature responded initially to treatment, but began to rise again almost immediately and tubercle bacilli were found in the sputum. The radiographic changes cleared partially, leaving substantial residua which were attributed to tuberculosis.

The third patient was admitted with unexplained fever. There was initially no cough, and no localizing sign in the chest; within a day or two she had started to cough, and abnormal physical signs and radiographic consolidation were detected at the left apex. A diagnosis of pneumonia was made, but a few days later tubercle bacilli were found in the sputum. The fourth patient was admitted with the signs of lobar pneumonia at the left base; her temperature failed to respond to penicillin, and tubercle bacilli were eventually found in the sputum.

Q Fever

There were two cases of Q fever. A woman aged 39 was probably infected in the South of France. She was admitted with an illness which had begun with febrile symptoms only, followed by dry cough and pleural pain. The temperature was 103.8° F. (39.9° C.) on admission, but she did not seem very ill. There was a segmental pneumonia of the right upper lobe, and the total white cell count was 8,000, with 86% neutrophils. The temperature failed to respond to penicillin but fell rapidly when aureomycin was added. The complement-fixing antibody for *Rickettsia burneti* rose from less than 1:8 on the eighth day of illness to 1:512 on the 35th. The second case was in a woman aged 63. She had been in the country near Windsor six days before the onset, but the source of the infection could not be traced. She was admitted on the sixth day of her illness, which had started with severe headache followed by dry cough. She was found to have pneumonia in both lower lobes, with a right basal pleural effusion, which on tapping yielded a greenish-yellow, thin, non-purulent fluid. The white cell count was 8,000, with 81% neutrophils. A minor growth of pneumococci was found in the sputum, but the serum showed a titre for *Rickettsia burneti* rising from 1:128 to 1:512.

Psittacosis

The sera of three patients showed high titres of complement-fixing antibody to the psittacosis group of viruses. In the first case the first serum was obtained only on the 45th day of the illness; the titre was 1:80 on three occasions and fell gradually over the next few months. In the second case the titre on the sixth day was 1:160 and fell slowly later. In the third case there was a rise from 1:80 on the fifth day to 1:160 on the 21st and higher than 1:160 on the 60th.

Skin tests varied from case to case. In the first, tests with both the Frei and heat-treated psittacosis antigens were negative; in the second the Frei alone was positive; and in the third the psittacosis alone.

The clinical picture in the three cases was not uniform, and in none was particularly suggestive of psittacosis. Nor was there epidemiological evidence to support the diagnosis. It is known that serologically there may be a cross-reaction between psittacosis and lymphogranuloma venereum and that titres for either may remain raised for long periods. In two of the patients there was a previous history perhaps consistent with lymphogranuloma venereum. Therefore, in the absence of a fourfold rise in titre, we think it doubtful that the illness we observed in any of the patients was in fact psittacosis.

Pneumonia with Cold Agglutinins

The discovery that among the large number of cases of apparently non-bacterial pneumonia of undetermined aetiology some, either sporadic or in local outbreaks, show auto-agglutination of the red cells by the serum at low temperature, encouraged the hope that this phenomenon, usually briefly described as "cold agglu-

tination," might serve to define an aetiologically distinct group. Cold agglutinins, however, are occasionally found in cases of pneumonia due to pneumococci and, very rarely, in those due to recognized viruses or to rickettsiae. It is to the group of cases of indeterminate aetiology showing cold agglutinins that the term "primary atypical pneumonia" has been most often applied. This term is illogical and has been used in several different senses; it should therefore be abandoned (Scadding, 1948). It can advantageously be replaced, in the contexts in which it has been most legitimately used, by "pneumonia, presumed due to an unidentified virus." The group characterized by cold agglutinins is generally assumed to be due to one aetiological agent, but there is no positive evidence that this is so. Eaton *et al.* (1944, 1945a, 1945b) claimed to have isolated a virus from cases of "primary atypical pneumonia" with cold agglutinins and to have demonstrated antibodies to the virus in the sera of convalescents. This work is not yet generally accepted (Horsfall, 1949). The Commission on Acute Respiratory Diseases in the United States has done transmission experiments in man and has also claimed to have demonstrated a virus responsible for pneumonia with cold agglutinins (Dingle, 1945).

There is confusion in the literature about the method by which the titre of the cold agglutinins is expressed. We use a 0.5% suspension of red cells. We express our results in terms of the final dilution of the serum, including that effected by the red-cell suspension. Even if allowance is made for discrepancies introduced by this confusion there is great divergence of opinion about the titre of cold agglutinins which is to be regarded as helpful in defining a distinct group among the pneumonias. Finland and Barnes (1951) accept a titre of 1:20 as specifically significant, though by this criterion positive titres were present in a number of their cases in which other aetiological agents were identified. We have found that titres as high as 1:64 have occurred in one or two cases in each of our aetiological groups except the tuberculous and staphylococcal pneumonias. Thus, with our technique, a titre up to that level cannot be regarded as specific. In our specific group, with titres of 1:128 or above, it was significant that in 5 out of the 10 cases there was at least a fourfold rise in titre while under observation. In all cases the highest titre was observed between the tenth and twentieth days of the illness.

Thomas *et al.* (1945) found specific agglutinins for a streptococcus—*Str. MG*—in pneumonias with cold agglutinins. In two of our cases in this group *Str. MG* titres of 1:80 or above were observed. In three cases in other aetiological groups titres of 1:20 were recorded.

In 3 of our 10 cases with what we regarded as significant titres of cold agglutinins the titres rose only to 1:128. Their ages (45, 64, and 77 years) were higher than those of the rest of the group; and two of them had pleural pain, which did not occur in the other eight. All three were very dyspnoeic. Two had lobar pneumonia and one had lobular pneumonia, and all presented a clinical picture indistinguishable from that of the bacterial pneumonias.

The seven patients with cold agglutinin titres of 1:256 or higher were aged 10 to 31 years; as a group they were thus much younger than the whole series or than any of the groups defined within it on aetiological grounds. Only one, a child of 10, had a history of recurrent bronchitis; one had had a sore throat before admission, but none of the others had any history to suggest a preceding upper respiratory infection. There was nothing characteristic about the anatomical distribution of the pneumonia; three had a lobar, two a segmental, and two a lobular distribution. Constitutional and febrile symptoms were severe in all seven. Initial headache was present in all and prominent in three. None had pleural pain. The sputum was mucoid in all. There was impressive dullness to percussion in only one, and the same case was the only one in which bronchial breathing was heard. Only two patients were dyspnoeic, and these both showed widespread fine rales in both lungs. The leucocyte count was 12,000 per c.mm. or less in five cases, but the other two had counts of 17,000 and 28,000 per c.mm. respectively, with 81% and 90% neutrophils; both these high counts were observed late in the disease. Penicillin, sulphonamides, or both were given in five cases with no convincing evidence of response. Aureomycin was given in three with prompt defervescence; two of these had previously received penicillin.

This account is consistent with the accepted picture of a "virus pneumonia" characterized by general rather than respiratory symptoms, absence of rusty sputum, no pleural pain, few localizing signs in the chest, a normal or low white cell count, and a poor response to penicillin and sulphonamides.

Pneumonias of Indeterminate Aetiology

Of the 52 patients whose pneumonia could not be classified in a specific aetiological group, 21 had received chemotherapy before admission. In 15 of the 21 the pneumonia was lobar in distribution and may therefore have been pneumococcal, the organisms having been masked by the chemotherapy.

In 31 other cases which could not be classified aetiologically no chemotherapy had been given before admission. Nine were lobar. In these the clinical characteristics, leucocyte counts, and response to therapy were consistent with the suggestion that they were bacterial pneumonias in which the causative organism was not isolated. As mouse inoculation was used only in the last two months of the investigation, it is probable that we missed laboratory confirmation of some cases of pneumococcal origin. Humphrey *et al.* (1948) have pointed out that the proportion of cases in which pneumococci are isolated can be increased by about a third by using mouse inoculation.

Thirteen of the 31 cases were of segmental distribution. In 11 of these 13 there had been some preceding abnormality of the respiratory tract; in four there was serological evidence of influenza B infection, in four a history of preceding upper respiratory tract infection, and in three of chronic bronchitis. In all except one the white cell count was 11,000 or more per c.mm. These facts suggest that in most of these cases the pneumonia was of the "aspiration" type (Ramsay and Scadding, 1939; Scadding, 1948, 1951).

Of the nine patients with lobular pneumonia for which no specific aetiology was determined, one was admitted late in the illness with involvement of one lung only and recovered rapidly. Several of the remaining eight patients with both lungs involved had had a recent upper respiratory tract infection or had chronic bronchitis. Their ages varied from 49 to 68 years, their illnesses occurred between October and March, and all seven in whom blood counts were done early in the illness showed a

high leucocytosis. It is reasonable to suggest that these were lobular aspiration pneumonias in elderly bronchitic subjects in which the severity of the illness varied according to the organisms incidentally present and the patient's resistance, local and general.

In summary there seems little evidence that our "indeterminate" group of pneumonias included any significant number due to a specific but as yet unidentified organism. Most of the cases can be accounted for by assuming either that they were "missed" specific bacterial pneumonias or that they were pneumonias associated with organisms derived from the upper respiratory tract and normally of low pathogenicity. These organisms had been enabled to gain access to the lower part of the broncho-pulmonary tree and there give rise to an inflammatory reaction, because of impairment of the host's defences, especially the local mechanical defences of the respiratory tract and possibly those of the body in general. The evidence for this view is indirect and incomplete, but it seems to provide a reasonable working hypothesis.

Seasonal Incidence and Complications

The seasonal incidence of the different aetiological types among our cases cannot have great significance owing to the small numbers. The pneumococcal cases mainly occurred between October and March, though there were a few cases in the summer months. All the staphylococcal cases were seen between October and April. Both the Q fever cases were admitted in June. Cases with cold agglutinin titres above 1:128 were scattered between October and June. All the cases with serological evidence of influenza B infection were seen between January and April.

A pleural effusion large enough to be aspirated occurred in 10 cases. In all 10 the pneumonia was lobar in distribution. Three were caused by pneumococci; in the remaining seven no aetiology was determined and cultures of the fluid were sterile, six out of the seven having had chemotherapy before admission. Only two of these cases developed a frank empyema; both recovered after surgical treatment.

Apart from pleural effusion there were few complications. One patient developed acute nephritis three weeks after the onset of a pneumococcal lobar pneumonia. A second had a thrombophlebitis of the leg while convalescent from a pneumococcal segmental pneumonia.

Deaths

There were 10 deaths. Details of these are given in Table II. The single death from pneumococcal pneumonia was in a man aged 69 who had had chronic bronchitis for many years. He was admitted exceedingly ill on the seventh day of his pneumonia and died in a few hours.

There were four deaths among the 10 cases of staphylococcal pneumonia. One out of the seven patients with staphylococcal lobar pneumonia died, but all three cases of staphylococcal lobular pneumonia were fatal. The death from staphylococcal lobar pneumonia was in a previously fit man aged 63 years who was admitted on the ninth day of a left upper lobe pneumonia which had been unsuccessfully treated with sulphonamides. He was desperately ill and had auricular fibrillation. There was no sputum, and blood culture was sterile. He was treated with sulphonamides and with penicillin 300,000 units six-hourly. His temperature fell and he appeared to improve for three days, but on the fourth day his temperature rose again and he became very weak. Consolidation was detected in his right lower lobe. The blood urea was 296 mg. per 100 ml. and he died the same day. Necropsy revealed purulent bronchitis and red hepatization of the left upper and right lower lobes; microscopically the affected lobes showed confluent bronchopneumonia. The kidneys were substantially normal. Penicillin-resistant staphylococci were isolated post mortem from his nose and from both the affected lobes. The case occurred in October, 1949, when there was no evidence of an epidemic of influenza B.

Two of the three fatal cases of staphylococcal lobular pneumonia were in women aged 80 and 86 years who became steadily worse in spite of chemotherapy. The third case was a fulminating one in a woman aged 33. Following an upper respiratory catarrh for four days she became very ill and was admitted on what was presumably the third day of the pneumonia. She was then desperately ill, and was given 250,000 units of penicillin.

TABLE II.—*Summary of Data on 10 Fatal Cases*

Case No.	Sex	Age	Aetiology	Anatomy	Leucocyte Count		Day Admitted	Day Died	Previous Chronic Bronchitis	Chemotherapy before Admission	Chemotherapy in Hospital
					Total per c.mm.	% Neutrophils					
69	M	69	Pneumococcal	Lobar	—	—	7	8	Yes	No	Aureomycin, 2 g., then 1 g. 4-hourly Total 5 g.
7	M	63	Staphylococcal	,,	17,000	93	9	13	No	Yes	Sulphonamides and penicillin, 300,000 units 6-hourly
17	F	86	,,	Lobular	37,000	90	2	8	Yes	No	Penicillin, 60,000 units 3-hourly
110	F	80	,,	,,	11,000	90	14	34	N.R.	Yes	Penicillin 300,000 units twice daily. Later streptomycin, 0·5 g twice daily
72	F	33	,,	,,	—	—	3	3	No	No	Penicillin, 1 dose of 250,000 units
99	F	76	Indeterminate	Lobar	27,000	95	30	39	N.R.	No	Penicillin, 500,000 units 6-hourly
13	M	64	,,	Lobular	16,000	68	18	21	Yes	No	Penicillin, 100,000 units 6-hourly
16	F	64	,,	,,	29,000	82	19	23	Yes	No	Sulphonamides and penicillin, 200,000 units 3-hourly
85	M	68	,,	,,	20,000	89	10	77	Yes	No	Penicillin, 250,000 units 4-hourly. Later streptomycin, 0·5 g 6-hourly
62	F	49	,,	,,	30,000	89	8	11	No	No	Penicillin, 200,000 units 3-hourly

N.R. = Not recorded.

She died within a few hours. Penicillin-sensitive staphylococci were obtained from the lungs post mortem. Efforts to recover influenza virus were unsuccessful, although the case occurred when influenza B infection was prevalent and presented clinical and pathological features suggestive of a fulminating influenzo-staphylococcal pneumonia.

Of the five fatal cases of pneumonia of indeterminate aetiology, four were lobular and one was lobar. All the patients except one were over 60 years old and had other complicating factors such as long-standing bronchitis, bronchiectasis, or cerebral softening. The exception, a woman aged 49, had no sputum, the blood culture was negative, and permission for post-mortem examination was refused. She may well have had a specific bacterial pneumonia which was not diagnosed. Two patients died after long illnesses, partly as a result of disease elsewhere, though lung consolidation was still present at the time of death. No bacteriological studies were made post mortem. Two others died earlier in the course of the pneumonia, and, in these, cultures from the lungs and bronchi were sterile, with the exception of a growth of *Staph. albus* from the bronchial wall in one; both had received large doses of penicillin up to the time of death.

Discussion

Full investigation of a series of cases of pneumonia, including thorough bacteriology and virus serology, is now a formidable undertaking, and not many such surveys have been published. The cases studied in the Medical Research Council (1951) therapeutic trial of antibiotics in pneumonia, of which part was conducted at Hammersmith Hospital, were investigated aetiologically, but that series is not comparable with the one studied in the aetiological survey which forms the subject of the present report. The therapeutic trial was restricted to patients who were admitted with an initial diagnosis of "pneumonia"; the present aetiological survey included not only these patients, but also those admitted with another provisional diagnosis—for example, "bronchitis" or "unexplained pyrexia"—and who later developed symptoms and signs on which a diagnosis of pneumonia was made after admission. Moreover, the therapeutic trial excluded patients who had received specific treatment before admission. On these criteria, the Q fever cases, some of those with significant titres of cold agglutinins, all those in the group "indeterminate aetiology, with chemotherapy before admission," and some of those in the specific groups would have been excluded.

The most important comparable aetiological survey in Great Britain is that of 351 cases of "primary pneumonia" admitted to the Central Middlesex Hospital in 1942–4, published by Humphrey *et al.* (1948) and Glover *et al.* (1948). Since the area from which these cases came adjoins that served by Hammersmith Hospital, a comparison of the findings is of special interest. The criteria adopted for inclusion in the two series were on the whole similar; the only important difference was that patients over the age of 70 years were excluded from the Central Middlesex Hospital series. The most obvious difference is the smaller proportion of pneumococcal pneumonias in our series. In the Central Middlesex series 79% of the cases were diagnosed as pneumococcal, but this diagnosis was made in some cases on clinical grounds, even though no pneumococci had been isolated. An attempt may be made to adopt comparable standards of diagnosis by comparing the percentage of cases in the two series from which pneumococci were isolated. This amounts to 56% for the Central Middlesex series and 26% in ours. Alternatively, if all the cases classified in our series as lobar pneumonia of indeterminate aetiology are added to those from which pneumococci were isolated, the total amounts to only 48% of all pneumonias. Positive blood cultures were obtained in 21% of our pneumococcal cases, so defined, compared with 5% of the Central Middlesex cases. In 1938–9 at Hammersmith Hospital, pneumococci were isolated from 67–68% of all pneumonias of lobar distribution, compared with 33% in the present series; the addition of all pneumonias of indeterminate aetiology treated before admission with antibacterial drugs increases the latter figure only to just under 50%.

It is possible that the fall in hospital cases of pneumococcal pneumonia in this area suggested by these figures is partly due to the successful home treatment of the less severe cases. That our cases were selected for severity, as compared with those treated at the Central Middlesex Hospital in 1942–4, is suggested by the percentages of cases with positive blood cultures given above. Wingfield (1951), also in London, saw only seven cases of what he regarded as typical lobar pneumonia among a series of 109 patients with pneumonia. He gives no detailed information, and it is difficult to make a useful comparison with our series. But it seems likely that the use of sulphonamides and penicillin by general practitioners has led to a fall in the proportion of patients with pneumococcal pneumonia admitted to hospital.

The numbers of cases due to bacteria other than pneumococci in the Central Middlesex Hospital series and in our own were comparatively small. They do not call for further comment except to point out the gravity of staphylococcal lobular pneumonia in both. The literature of staphylococcal pneumonia has recently been well reviewed by Gibson and Belcher (1951). Although they record the high mortality of staphylococcal pneumonia in published series, they themselves had no deaths among their 10 cases. But Stuart-Harris *et al.* (1950) have drawn attention once more to the fulminating type of staphylococcal pneumonia which may accompany acute influenza and prove fatal within a few hours. One of our cases seemed likely to have been of this type, but no influenza virus was recovered from the lung.

It is worth emphasizing that cases of tuberculosis may be admitted with acute pneumonia and may be missed unless tubercle bacilli are sought in the sputum in all cases. If a case of pneumonia does not respond to conventional treatment, tuberculosis should always be kept in mind and further sputa examined.

There was some serological evidence of rickettsial or virus infection in 26 out of 110, or nearly a quarter, of our cases. In 11 of these the virus was influenza B. In the Central Middlesex Hospital series in 1942–4 serological tests for influenza were not carried out and Q fever was not then recognized as a possible cause of pneumonia in London. Six cases of probable psittacosis were identified among 45 cases tested, and the virus was isolated in one of these. On the other hand, what were regarded as significant titres of cold agglutinins were found in only 2 of 95 cases tested at the Central Middlesex; one of these had myeloid leukaemia and the other later developed a pneumococcal empyema. We found 10 cases among 110 tested. It is possible

that this type of pneumonia was introduced to Great Britain during the war and that its incidence has increased since 1944.

Finally it must be remembered that serological diagnoses in pneumonia are made retrospectively. The results are not available in time to assist in immediate diagnosis or to act as a therapeutic guide. Decisions about the management of a case will often have to be made on clinical grounds alone, bearing in mind, of course, that other factors besides a virus cause may account for failure to respond to penicillin or sulphonamides.

Summary

110 cases of pneumonia admitted to Hammersmith Hospital between October, 1949, and September, 1950, were fully investigated from the aetiological point of view.

In 58 cases laboratory investigations provided specific aetiological evidence—29 were pneumococcal, 10 staphylococcal, 4 tuberculous, and 10 associated with significant titres of cold agglutinins. There were two cases of Q fever and three doubtful cases of psittacosis. Eleven cases, scattered among the other aetiological groups, showed serological evidence of recent infection with the virus of influenza B.

In 52 cases no specific aetiological agent was identified, but 21 of these had had chemotherapy before admission. Reasons are given for suggesting that in these 52 cases there were few, if any, attributable to any specific but as yet unidentified aetiological agent.

The clinical aspects of the various aetiological groups are discussed.

The bacteriological investigations, on which so much depended in this work, were carried out successively by Dr. Hilda Boffa, Dr. D. R. Barry, Dr. M. Millard, and Dr. O. G. Jones. We are most grateful to them and to Dr. W. Hayes, Dr. D. A. Mitchison, and Dr. G. M. Ross, of the Department of Bacteriology, Postgraduate Medical School of London, who have taken a keen interest in the study. We are glad to acknowledge the help of Dr. J. V. Dacie with the cold agglutinin estimations. We also record our gratitude to our colleagues in the Department of Medicine, who have allowed us to investigate their patients, and to the nursing staff and laboratory technicians who have done so much to assist our work.

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In its *Annual Report, 1951*, the National Institute for the Deaf (105, Gower Street, London, W.C.1) notes that many of the larger cinemas, including 300 on the Gaumont and Odeon circuits, have now had hearing-aids installed to help partially deaf members of the audience. These aids are not yet being fully used, and the Institute is arranging social evenings in collaboration with Circuits Management Association, Ltd., to popularize their use among the hard of hearing.

LUNG INVOLVEMENT IN INFLUENZA

BY

JOHN FRY, M.B., F.R.C.S.

(From a General Practice)

This is a report on a group of cases seen in a general practice during last winter's influenza epidemic. This practice, a single-handed one, is situated on the south-eastern urban outskirts of London, and consists of approximately 4,000 patients, who belong sociologically to the "lower middle classes."

During a period of seven weeks, from the end of December, 1950, until mid-February, 1951, 223 cases were diagnosed as epidemic influenza, and it is these cases which are reported. This figure represents 6% of the total population of the practice. It should be pointed out that there must at the same time have been quite a considerable number of other cases of mild influenza, for which medical advice was not sought.

Diagnosis

The word "influenza" has unfortunately become a byword in clinical medicine for the description of almost any vague clinical short-term febrile condition without any localizing signs. Influenza can be definitely diagnosed only by isolating the virus from a suspected case. This, however, is a costly and impracticable procedure in general practice. The diagnosis is much more accurate during an epidemic than when dealing with sporadic interepidemic cases. It is thus probable that the diagnosis was correct in these cases. Epidemic influenza is a specific disease, both aetiologically and clinically.

The clinical features on which the diagnosis of influenza was based in this series correspond exactly with those reported in previous epidemics (French, 1920: Stuart-Harris *et al.*, 1937). Most patients presented a remarkably uniform picture, case after case exhibiting features which differed from one another only in grades of severity.

The patient, usually in good health, is suddenly taken ill. This sudden onset is characteristic. The most frequent early symptoms, apart from general malaise and fever, were frontal headache, pains in limbs and back, pain behind the eyes, and symptoms of irritation of the respiratory tract—that is, cough and coryza. Gastro-intestinal symptoms were not common. In 12 patients vomiting occurred during the early phase, but diarrhoea was not noted in any case. If "gastric influenza" is a clinical entity one would expect to see a good number of cases with vomiting, abdominal pain, and diarrhoea during this period of the epidemic. Such cases were not seen. It is therefore probable that "gastric influenza" is a loose and inaccurate term for gastro-intestinal upsets of unknown aetiology, and its use is deprecated.

On examination at this early stage there were no localizing signs. There was marked constitutional upset, the patient being drowsy, heavy-eyed, feverish, and ill-looking. The fever varied from 99 to 105° F. (37.2 to 40.6° C.), and the pulse rate was correspondingly rapid. The fauces were injected, but no exudate was seen. The normal course of the uncomplicated case was persistence of symptoms and fever for two to five days. The

cough, however, went on for a further two to three weeks. Most of the patients were fit to resume their normal duties in 14 days.

The age distribution of these cases is shown in Table I. The youngest patient was 4 and the oldest 85. The majority were between 20 and 60, the average being 38½.

TABLE I.—*Age Distribution*

Age:	0–9	10–19	20–29	30–39	40–49	50–59	60–69	70–79	80–90
No. of cases	5	17	36	63	27	49	15	8	3

There were 130 males and 93 females. Note was made of the degree of involvement of family groups. In the whole series there were 30 (14%) instances of familial involvement—that is, more than one case per household. These accounted for 71 individual infections. This is surprising, as there remain 152 persons who were apparently the sole cases of influenza in their particular household. There is an obvious possible error in that in other cases which may have occurred medical attention was not needed or sought. It does suggest that the degree of personal infection is this series was not great.

In the group of cases with definite lung complications (see below) there were eight instances of familial involvement out of 37 cases (22%). No deaths occurred in this series and no patient required admission to hospital. Only five patients were aged under 10 years; this is in keeping with the 1918–19 epidemic. The illness in these appeared to be more severe, with persistent lung signs in all the cases, but recovery was rapid and complete. Difficulty was experienced in diagnosing influenza in children. It was felt that this diagnosis was the correct one, as in all the five cases there had been previous adult cases in the household, and during the period under discussion there was a relative paucity of other seasonal respiratory tract infections. The clinical picture in these children was similar to that in the adult, with a sudden onset, but the child appeared more ill and signs and symptoms were particularly referable to the chest.

Differential Diagnosis

It is appropriate at this stage to say a few words concerning the diagnosis of influenza. As has already been stated, accurate diagnosis is not easy, because there are many other common and uncommon ailments with similar initial clinical features.

Febrile Catarrh.—This condition, although having many features in common with epidemic influenza, should be differentiated. According to Stuart-Harris *et al.* (1937), the onset is more insidious, with a premonitory "cold in the head." The subsequent course is dominated by a paroxysmal cough and a sore throat, which is a prominent feature in this condition. Headache is not so frequent and there is less general constitutional upset. These investigators were unable to isolate the influenza virus from cases with these features.

Acute Tonsillitis.—This condition is commonly met with in epidemic form in general practice, and it often follows a dry and warm spate of weather. There is a sudden onset with a marked constitutional upset, fever is usually above 101° F. (38.3° C.), and there is an extremely sore throat. Cough and coryza are absent. On examination the tonsils show a whitish-grey exudate.

Miscellaneous Group.—Under this heading can be grouped conditions such as atypical and lobar pneumonias, pyelitis, infective hepatitis, and meningitis—in fact, any febrile condition can initially present as "influenza." In these cases localizing signs are usually found in a few days.

Chest Complications and Clinical Classification

It was possible, retrospectively, to classify the cases seen into a number of separate clinical groups, depending on the severity with which the respiratory tract was involved.

Group 1: No Involvement of the Respiratory Tract

Twenty cases presented with a sudden onset of illness characterized by malaise, headache, and limb pains, but with no cough, sore throat, or nasal discharge.

Group 2: Typical Influenza with no Lung Involvement

These cases presented with the typical clinical picture already described, and there were no persistent abnormal physical signs in the chest. This was by far the most frequent form of presentation, there being 166 cases. The probable pathology was that of a tracheitis and pharyngitis.

Group 3: Signs of Lung Involvement but no Pneumonic Consolidation

This group was particularly interesting. There were 33 cases (12 male, 21 female). The age incidence is shown in Table II. The oldest was 78 and the youngest

TABLE II

Age:	0–9	10–19	20–29	30–39	40–49	50–59	60–69	70–79	80–90
No of cases in Group 3	5	—	2	6	2	9	3	6	—
Total No. of influenza cases ..	5	17	36	63	27	49	15	8	3

4, the average age being 46. All except six had a previously clear medical history. Of these six, one was a manic-depressive, two were hypertensives, one man aged 36 had slight ankylosing spondylitis, one little girl aged 4 had suffered from mild asthma, and one man had had recurrent winter coughs. It was at the two extremes of age that the proportion of these cases was highest.

Clinically a further subdivision could be made as follows:

(*a*) *Signs Present at Onset* (*Three Cases*).—The patient presented with a severe typical influenza, and during the initial examination and follow-up persistent inspiratory rales were noted. This picture was found in three patients.

(*b*) *Signs Found After a Latent Period* (*30 Cases*).—All these cases had a similar history. The onset was as in the typical case, but instead of the condition settling in three to six days the patient continued to feel ill and had a most distressing and irritating productive cough. Sputum was quite profuse, being sticky and mucopurulent. In two cases persistent blood-staining was observed. Pain in the chest, overlying the site of the lesion, was complained of by six patients. This pain was not a typical pleuritic pain, but more dull in character. A pleural rub was heard in three patients. One patient complained of left shoulder-tip pain in association with a left basal lesion. On examination the patients looked ill, but were not severely distressed apart from the cough. There was no cyanosis or dyspnoea. The respiratory rate was normal in all cases. Fever was not particularly high: in only three cases was a figure of over 101° F. (38.3° C.) recorded. A most striking feature was the frequency with which a relative bradycardia

was observed. In 10 adults the pulse rate was below 70. The characteristic features were found in the chest, and consisted of a slightly impaired percussion note, diminished air entry, and fine inspiratory rales over the affected area. This area of involvement was not anatomically distinct, the distribution being as follows: right base alone in 16, left base in 13, right upper zone in 3, and both bases in only 1 case.

Unfortunately, complete pathological investigations were practically impossible. In six cases a bacteriological examination of the sputum was carried out. The organisms found varied; *Streptococcus viridans, Neisseria catarrhalis,* and haemolytic streptococci (two cases) were the most frequent. A chest radiograph was possible in only four cases during the period when the signs were present, and in none of them were there abnormal findings.

In all these patients the signs cleared completely, the time taken for this being from 2 to 28 days (average 10 days).

Treatment consisted of rest in bed until all signs had cleared. Apart from general measures, specific therapy was tried in 18 patients. "Sulphatriad" (15 g.) was used in seven, procaine penicillin (750,000 units daily) in four, chloramphenicol (9 g.) in six, and "aureomycin" in one. It was my impression that these antibiotics did not shorten the time taken for the signs to clear. In the later cases these drugs were not used and the results were equally satisfactory.

Case 1.—A housewife aged 50 suddenly felt unwell on December 26, 1950, with shivering, aching in limbs and back, and an irritating cough. She remained in bed for two days and then got up. She continued to feel ill, the cough became worse, with blood-stained sputum, and a dull pain had developed in the left lower chest. I first saw her on January 2, 1951 (she had been seen elsewhere on the day of onset). She did not look very ill; her temperature was 99.4° F. (37.4° C.), and pulse rate 72. Chest examination revealed fine inspiratory rales at the left base with diminished air entry but no alteration in the percussion note. She was treated with 750,000 units of procaine penicillin daily for six days. Fever subsided within three days, but signs did not clear until January 15. A radiograph of the chest on January 12 did not show any abnormalities.

Case 2.—A housewife aged 34 had a sudden onset of frontal headache, shivering, aching limbs, and cough on December 24, 1950. Symptoms persisted, and she was first seen on December 28, when, apart from general fever with a temperature of 102° F. (38.9° C.) and pulse rate of 98, there were no abnormal physical signs. On the 30th inspiratory rales with a diminished air entry were noted at the right base. She was treated with chloramphenicol, 0.5 g. six-hourly, receiving a total of 9 g. The fever gradually settled in four days, but the chest signs persisted for a total of 12 days. A chest radiograph in mid-February was normal.

Group 4: Signs of Pneumonic Consolidation

These were four previously fit patients in whom clinical signs of consolidation were found. The average age was higher in this group—being 56. The onset and the course of the illness were similar to those of the previous group, but the patients were much more severely ill and signs of consolidation were present. These signs appeared four or five days after the onset of the acute condition. A striking feature in this group was the more obvious response to antibiotics. The average time for signs to clear completely was 15 days, and all four patients recovered.

Case A.—A housewife aged 57, whilst nursing her husband with influenza, began to feel unwell, with weakness, cough, and "pains all over." She attempted to carry on her duties for a further three days, when she literally collapsed. When seen on January 21, 1951, she was extremely ill: her temperature was 103° F. (39.4° C.), pulse rate 125, and respiratory rate 32. Alae nasi were working, but there was no cyanosis. She was mentally confused and disorientated. Chest examination showed signs of a classical left lower lobar pneumonia. In view of the severity of her condition she was given 750,000 units daily of procaine penicillin intramuscularly and 0.5 g. of chloramphenicol six-hourly, receiving a total of 12 g. She remained severely ill for 72 hours and then began to improve. Her temperature returned to normal in five days, and signs had all cleared by the twelfth day. A bacteriological examination of the sputum on January 23 showed *Str. haemolyticus* (Lancefield Group C).

Group 5: Fulminating Pneumonia

No such cases were seen in this particular series, but in previous epidemics, and elsewhere in this present one, they were encountered. This condition is often rapidly fatal and *Staphylococcus aureus* is often found in the lungs at necropsy (Stuart-Harris *et al.*, 1950; Scadding, 1937).

There were no other frequent complications other than those grouped above; but one man, aged 34, developed a left choroiditis which took three months to clear. He had had a similar history six years previously, also following influenza.

Discussion

An accurate diagnosis of influenza is difficult, particularly in sporadic cases. The diagnosis is most likely to be correct during epidemics. It is much easier to describe what is not influenza than what is, and in general practice a number of other common ailments have to be differentiated. As this series of cases occurred during a country-wide epidemic and the clinical picture was similar to that in previous epidemics, it is probable that the diagnosis was correct. I am also informed that cases conforming to all four groups described were examined elsewhere and presented serological and other evidence of infection by influenza A during the period January and February, 1951.

Particular attention was paid to the incidence of lung complications, and it was found that signs of definite lung involvement were present in 37 out of the 223 cases studied. This represents a 17% incidence. Bloomfield and Harrop (1919) found abnormal lung signs in 7% of 300 cases; Stuart-Harris *et al.* (1937) had an incidence of 28% in 120 cases; Scadding (1937) reported 69% in 58 cases; and Ogilvie, Mavor, and Weymes (1950) reported 10% out of 61 cases studied.

It is impossible to dogmatize on the pathological changes in human influenza, particularly so when, as in this case, there were no opportunities of studying the morbid anatomy.

Influenza is a generalized virus infection with predominant effects in the respiratory tract. The severity of the lung involvement varies in individual cases and in different epidemics. In this series the effects were mild and there were no fatal cases.

The grading of cases as attempted indicates an infection of the respiratory tract which reaches different descending levels. Thus Group 2 is probably a pharyngo-tracheitis. Group 3 presents an interesting pathological speculation. The signs—inspiratory rales accompanied by diminished air entry, which were present usually at one or other base—seem to indicate a parenchymatous infection falling short of actual consolidation, the actual pathological change being a "bronchiolitis" or "pneumonitis." This is in keeping with experimental findings in animals.

Straub (1937) found that influenza A virus, administered under anaesthesia, in mice and ferrets produced a necrosis of the epithelium of the finer bronchioles. There has been a good deal of discussion over the relative roles of virus and bacteria in producing lung lesions in influenza. It is interesting to note that in this series there was a more dramatic response to antibiotics in Group 4 cases, and, although there was a relatively small number of these, there was a suggestion that the beneficial response was due to the presence of a severe secondary antibiotic-sensitive bacterial infection. The lack of response in Group 3 cases might have been because the condition was a more predominantly virus infection which was insensitive to the antibiotic drugs used.

The relative rarity of classical lobar pneumonia in present-day general practice should be noted. In my practice only three cases of this condition have been met with in the past five years. During this same period some 40 cases of unilateral lung infection were seen, having the general picture of the cases described under Group 3.

Summary

A report is presented on 223 cases of clinical influenza seen during the epidemic of last winter.

Difficulties in accurate diagnosis are discussed and the clinical features of influenza described.

The incidence and type of lung involvement are discussed. Signs of lung involvement were found in 17% of the cases. The particular frequency of a "bronchiolitis" or "pneumonitis" is noted. There were no deaths. There was an absence of any real response to antibiotic drugs in this group, but a good effect was obtained in the four cases with pneumonic consolidation.

A correlation is attempted between pathological and clinical features and the relative roles of virus and bacteria.

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EFFECT OF CORTISONE ON REACTION OF SKIN TO ULTRA-VIOLET LIGHT

BY

KLAUS A. J. JÄRVINEN, M.D.

Assistant Teacher at the Third Medical Clinic of the University of Helsinki

Recent investigations have revealed an increasing number of diseases the symptoms of which disappear or are ameliorated during the administration of cortisone in doses that are massive compared with the physiological hormone requirement. An explanation of the mechanism of this action has been sought in the rather basic changes produced in the organism. One of the central problems in this respect—the effects of cortisone on the reactivity of the organism when subjected to various stresses—still remains to a large degree unsolved.

With the use of an adjusted dose of radiant energy as a stress I have studied the change in reactivity caused by massive dosage of cortisone; the radiation was applied to a tissue (skin) in which its effects were easily observable. The results of such an experiment may be thought to be of general interest.

Material and Method

Experiments were made on 14 patients treated with massive doses of cortisone. (The preparation used was cortone acetate, or 11-dehydro-17-hydroxycorticosterone-21-acetate, produced by Merck and Co., Inc., U.S.A.) Nine of the patients suffered from rheumatoid arthritis, one from rheumatic fever, one from neurocirculatory asthenia, one from bronchial asthma, one from ulcerative colitis, and one was a suspected case of brain tumour. Eight of the patients were females and six were males. The average age was 41.5 years.

A mercury quartz lamp (2.5 amp., 220 volts) was the source of the radiant energy. The lamp was 19 cm. from the focus, and an opaque plate with five holes for the exposure was placed at this distance. (The diameter of the holes was 6 mm., and their centres were 15 mm. from each other.) In order to ensure that the amount of radiant energy would be constant, at every session the lamp was on for five minutes before the actual exposure. Thus the terminal radiation due to an increase in the temperature of the lamp may also be regarded as identical at the different sessions.

The volar surface of the forearm was selected for the exposure, using a different site each time, since it is known that the sensitivity of the skin to ultra-violet light is greatly reduced by previous exposure to it (Ellinger, 1932; Schulze, 1946). As the experiments were made during the period from December to February it can be assumed that, at the latitude of Helsinki, the sensitivity of the skin of hospital patients would not have been reduced by exposure to sunlight during the intervals between treatment. At the exposure the opaque plate with the holes was pressed against the site of the skin to be treated. The middle part of the forearm was chosen for the exposure during the administration of cortisone. Before and after its administration the exposure was directed on each side of this area (areas possibly less sensitive to radiation).

The duration of the exposure through the different holes was ½, 1, 3, 6, and 6 to 20 minutes. After preliminary tests an attempt was made to adjust the length of the longest exposure in such a way that it would produce blister formation.

The reactions of the skin were read 6 and 24 hours after the exposure. Ellinger (1932) recommended a reading after 7 and 24 hours. Attention was paid: (*a*) to the shortest exposure which produced a visible reaction in the skin; (*b*) to colour changes at the site of the exposure—these were classified according to Schulze (1946), in three groups: (1) red erythema, (2) red erythema and brown pigment, and (3) brown pigment only; and (*c*) to blister formation at the site of the exposure and to the diameter of the blister.

Results

The results obtained are given in the Table. These show that the reactivity of the skin to radiant energy was on an average reduced during a massive dosage of cortisone. A protective reaction appeared in the skin only after a dose of radiant energy about twice

that effecting a similar reaction before the cortisone. The type of cutaneous reaction also changed on the administration of cortisone. Instead of the previously erythematous reaction, there tended to be an increase of brown pigmentation. A suppression of the reactivity of the skin to higher doses of radiation was also observed. In spite of the use of greater amounts of radiant energy during the cortisone treatment than those required to produce a burn blister of second degree before its administration, blister formation now occurred in only a few cases.

Every change in reactivity of the skin seen during the cortisone treatment returned to normal after treatment (see Table). Any deviation in the results obtained

TABLE *Showing the Effect of Massive Doses of Cortisone on the Reactions of Skin to Ultra-violet Light*

	Before Cortisone	During Administration*	After Cortisone†
Minimum exposure required to produce a skin reaction observable after 6 hours. Mean ..	41 sec.	88 sec.	72 sec.
Type of reaction at site exposed for 6 minutes. Reading 6 hours after exposure			
No. of cases with:			
Red erythema	7	2	6
Red erythema and brown pigment	7	9	7
Brown pigment only ..	0	3	1
Maximum exposure at one site. Average	11·1 min.	15·1 min.	14·1 min.
No. of cases with vesicles after this exposure ..	9	3	10
Sum of diameters of the vesicles	45 mm.	11 mm.	43 mm.

* Cortisone had been administered for at least five days. The average dose before exposure was 1,038·6 mg. The minimum dose was 500 mg.
† The administration of cortisone had been stopped on an average 5·2 days previously. Administration had been carried on for an average period of 18·8 days, and the amount of cortisone given during this time was on an average 1,969·3 mg.

after treatment from those made before it depends possibly on the short interval between the end of the administration and the exposure (average 5.2 days) : the reactions may still have been under the suppressing influence of cortisone. This is also supported by the finding that among the rheumatoid arthritis patients only five had developed a severe relapse at the time of the control exposure, after disappearance of the symptoms during cortisone treatment. In the remaining four, relapse occurred as late as one to five days after the exposure.

Discussion

The above experiments show that a massive dosage of cortisone reduces the sensitivity of the skin to radiant energy. It may be questioned whether such an action is favourable. Is it an inhibition of the protective mechanisms of the body, or does it mean a true increase in resistance ?

The view that the observed phenomenon should be regarded as a suppression of the normal protective mechanisms is supported in particular by observations made in connexion with various infectious diseases. It has been found that massive doses of cortisone inhibit or prevent the typical symptoms of acute infectious diseases, such as fever, the development of inflammatory tissue changes, a rise in erythrocyte sedimentation rate, the production of antibodies, etc., whereas, for instance, the growth and propagation of organisms in bacterial infections proceeds even more rapidly than normally (Germuth and Ottinger, 1950 ; Glaser *et al.*, 1950 ; D'Arcy Hart and Rees, 1950 ; Bjørneboe, 1951). Similarly, the obvious reduction of the mineralo-corticoid secretion of the adrenal cortex—which secretion plays an important part in the normal protective reactions of the organism—also supports the view that the observed effect is due to a suppression of the normal protective mechanism of the body. Massive doses of cortisone have been observed to produce atrophy of the adrenal cortex in experimental animals (Nichols and Miller, 1949 ; Stebbins, 1950 ; Antopol *et al.*, 1951). This finding corresponds with the clinical observations on man of symptoms suggesting Addisonism (Sprague *et al.*, 1950), and of a decreased excretion of 17-ketosteroids during massive administration of cortisone (Wilkins *et al.*, 1951).

Accordingly there are findings which suggest that *cortisone in massive doses is not a means for fighting against the primary cause of a disease, but, on the contrary, a factor preventing the, generally expedient, protective reaction of the organism itself.* Since most of the symptoms of diseases are expressions of the protective reaction of the body, it is obvious that a factor suppressing this reaction eliminates the majority of the symptoms of various diseases. It is quite a different question whether such a "cure" of the symptoms is desirable, for diseases in which one may with certainty ascribe the symptoms to a wrong overactivity of the protective mechanism are somewhat rare.

Summary

A change, mainly a suppression, in the reactivity of skin exposed to a mercury quartz lamp was observed during the use of massive doses of cortisone. The minimum exposure required to produce an observable reaction in the skin was approximately doubled. Instead of the earlier red erythematous reaction the skin tended to react with an increase of brown pigment. Blister formation occurred much more rarely than normally.

The observations possibly suggest, in support of earlier studies, that massive doses of cortisone are not a universal means of protection against the causative agents of disease, but, on the contrary, a factor suppressing the protective mechanism of the organism.

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A former instructor in philosophy and novitiate in a monastery who had only brief medical experience as an orderly in an eye and ear infirmary in Boston was said to have established a brilliant reputation as a ship surgeon in the Royal Canadian Navy (*The Times*, November 22). He served in the Canadian destroyer *Cayuga* in Korean waters and successfully performed various operations, such as amputations and removing a bullet close to the heart. According to the Navy's statement nothing has occurred to indicate that he did not possess the competence of a fully qualified medical man ; he is nevertheless to be discharged from the Navy for misconduct.

OBSERVATIONS ON THE TEMPERATURE OF THE HUMAN RECTUM

BY

JOHN GRAYSON, M.D., M.Sc.

(From the Department of Physiology, University of Bristol)

Bernard's concept of the *milieu intérieur* was a vital step in our understanding of the human body. It is fundamental to realize that much of our biological activity is concerned in the maintenance of the so-called internal environment. But it is becoming increasingly clear that a rigid approach to the body constants which constitute this internal environment is no longer wholly acceptable. Such standards as blood pressure, once the inflexible index of an individual's circulatory health, are labile to a degree which even now is insufficiently realized.

The present paper is concerned with body temperature, another so-called "body constant" which displays great elasticity. For tissue temperature varies not merely with the general heat equilibrium of the body but also with the organ under consideration, with its anatomical location, its functional activity, and, in many cases, with the state of its circulation.

Recent observations show that a temperature gradient exists between the surface layers and the deep structures in the extremities. Moreover, the temperature of resting muscle is very much lower than either rectal or mouth temperature (Barcroft and Edholm, 1946). Thus in the uncovered resting forearm deep muscle temperatures as low as 30.7° C. were commonly found, with subcutaneous temperatures of 28.5° C. and skin temperatures of 27.9° C. Even when covered, the deep muscle temperature was only 36.2° C.

The work of Bazett and his co-workers (Bazett, Mendelson, *et al.*, 1948) has demonstrated, further, that the temperature of the blood in the brachial and radial arteries is far lower than had hitherto been assumed, temperatures as low as 31° C. having been recorded from a radial artery in a human forearm not particularly cold to the touch. Bazett postulated "pre-cooling" of the artery and its contents by the accompanying venae comites carrying cold blood away from the fingers. It is abundantly clear, therefore, that the tissues of the extremities can no longer be regarded as functioning in an environment approximating in temperature to that of the rectum, and it seems unlikely, in the resting state, that skeletal muscle is of much importance in heat production.

Unpublished observations on ten cases made jointly with Professor F. H. Bentley fully confirm these findings. They suggest, moreover, that the temperature of other extraperitoneal organs is also below that in the peritoneal cavity. Thus, in one unclothed individual the temperature of the toes was 20° C.; that of the deep thigh muscles was 35.2° C.; the temperatures of the deep abdominal musculature and of the renal pelvis were 36.4° and 36.8° C. respectively. The temperatures in the regions just deep to the peritoneum and in the rectal ampulla were both 37.1° C. Similar distributions of temperature were found in all cases examined.

It has therefore been suggested that the temperature of an organ depends in part upon its depth below the skin and in part upon its anatomical relation to the abdominal cavity. Yet, even in the abdominal cavity itself, temperatures vary with the organ concerned and the state of its functional activity. Wiggers and Orias (1932) have shown clearly that liver temperature in the dog is about 1° C. above all other intraperitoneal temperatures. Federov and Shur (1942) showed, too, that in the dog the lowest intraperitoneal blood temperatures were to be found in the abdominal aorta, whereas the highest were in the hepatic vein. They demonstrated that increased metabolism exaggerated this difference. The evidence strongly suggests that the principal sources of body heat in the quiescent subject are intraperitoneal and it may well be, as suggested by Federov and Shur, that the organs concerned are the liver and, to a less extent, the intestines.

Heat production in the body would appear, then, to be considerably more centralized than has often been assumed. Also when one remembers the role of the skin as a radiator of heat, it is not surprising that the temperature of a peripheral organ varies directly with its proximity to the peritoneal cavity and inversely with its depth below the skin. But other factors are equally important in determining tissue temperature. Whereas the influence of local heat production in resting extraperitoneal organs is small, the state of the circulation is of prime importance. The temperature of the digits, for example, may vary in normal individuals exposed to a room at about 18° C. from about room temperature to 35° C. or over, according to the presence or absence of cutaneous vasodilatation. The effect of the circulation on temperature is, of course, less marked in the proximal parts of the limb, but, even here, in deeply situated muscle, it is the factor of increasing blood flow which is largely responsible for the rise in temperature which occurs during moderate exercise (Barcroft and Millen, 1939).

It is evident that there is no one measurement which can fairly be called "body temperature." The best that can be hoped for is a compromise which will indicate roughly the balance between heat production and heat loss in the body. In this respect the temperature of the rectum has long occupied a position almost sacrosanct. Of all the readily available measurements this is the one which above all others has been regarded as an accurate indication of the thermal equilibrium of the body.

Recent observations have, however, made it clear that rectal temperature does not always behave as might be expected. The work of Bazett, Love, *et al.* (1948) has shown that the temperature of the terminal few inches of the rectum may be influenced directly by venous return from the lower limbs. Even allowing for this source of error, peculiarities have been observed. As long ago as 1778 Leslie reported that immersion of the body in cold water frequently caused a rise in temperature. Bazett, Love, *et al.* (1948) reported similar findings. Kerslake and Cooper (1950) showed, too, that exposing the body to heat may conversely produce a fall in body temperature. The rise which follows immersion in cold water has been explained as possibly being due to reflex vasoconstriction in the skin, resulting in a reduction of heat elimination and a consequent warming of the body by the continued heat production. In Kerslake and Cooper's experiments, in which the trunk was heated and the hands were left exposed to the room air, the fall in rectal temperature might also be explained as being due to the vasodilatation in the skin of the hands and a consequent increase in heat elimination.

It is the object of this paper to demonstrate that these explanations cannot be complete, and that the temperature of the rectum—like the temperature of peripheral organs—can be affected by the blood flow through it.

Methods

The observations leading to the present investigation were first made during experiments which primarily concerned the responses of the skin circulation to environmental temperature changes. The findings of Leslie and of Kerslake and Cooper, referred to above, were fully confirmed. Thus, cooling the body produced a rise in rectal temperature, warming the body a fall. Simultaneous records of skin and of rectal temperature, however, suggested that the rectal-temperature changes were frequently too rapid and too similar in timing to the vasoconstriction and the vasodilatation which took place in the skin to be the simple result of altered heat-balance.

To investigate the matter further, a more delicate measurement of rectal temperature was used, together with observations of blood flow in the rectum. Rectal temperature was measured thermo-electrically, using copper-constantan thermocouples, a delicate moving-coil mirror galvanometer, a slit-lamp, and scale. The movements of the light on the scale were recorded continuously on a kymograph by means of a manually operated mechanical device (Schmidt and Pierson, 1934). Temperature changes of 0.001° C. could be accurately detected.

Blood-flow changes in the rectum were measured by using the heated thermocouple blood-flow recorder described previously (Grayson, 1951b) and derived from the instrument first described by Gibbs (1933). It consisted of a small mass of copper about 1 mm. in diameter, which could be heated by the passage of an electric current through a fine attached filament of constantan wire. A copper-constantan thermojunction, also joined to the copper sphere, was connected to a simple thermoelectric circuit consisting of a second thermojunction (the cold junction), a moving-coil mirror galvanometer, and a resistance. Heat applied to the recording couple produced a flow of current (measured by means of the galvanometer), which in accordance with thermoelectric principles was directly proportional to the temperature difference between the recording and cold junctions. In the present experiments the copper sphere, with its attached thermojunction and leads supplying the heater filament, was inserted 6½ in. (16.5 cm.) past the anal orifice and lay in the ampulla of the rectum. The cold junction was also inserted rectally. Current was passed through the heater sufficient to raise its temperature 2° C. above that of the cold junction. Both heated couple and cold junction were equally affected by genuine alterations in body temperature, but an increase in rectal blood flow was shown to cool the relatively hot heated thermocouple; a decrease in rectal blood flow permitted it to warm up further. These changes produced measurable galvanometer deflections and, subject to limitations which will be fully discussed elsewhere, the apparatus provided reliable records of rectal blood-flow change (Grayson, 1951b).

Results

Many of the observations described below were made in the course of other investigations, primarily concerned with the effect of environmental temperature on the cutaneous and visceral circulations. It is not the present purpose to consider the physiological implications of the blood-flow findings, but simply to relate the temperature of the rectum to vascular events in the bowel.

Effect of Increasing External Cold Stimulus

Cold stimulus at the surface of the body was increased by exposing the abdominal wall of a fully covered subject to the room air at about 18° C. or by immersing the right hand and forearm in water at 7° to 9° C. Both stimuli have been previously shown to produce vasodilatation in the intestine (Grayson, 1950). In the four experiments shown in Fig. 1 the blood flow in the

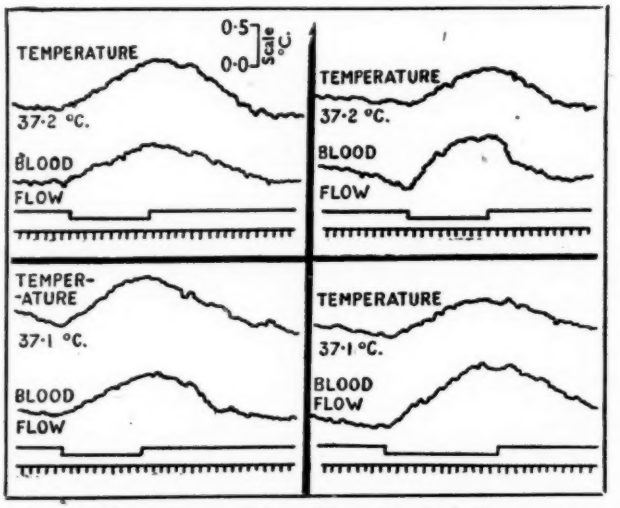

FIG. 1.—Temperature and blood-flow changes in human rectum of four subjects. The effect of cold stimulus—exposing the abdomen to the room at 18° C. The blood-flow records were taken using the heated thermocouple recorder. Upward movements denote increased flow, downward movements decreased flow. Tracings from original kymograph records. Time base = 30-second intervals.

rectum was recorded by means of the heated thermocouple. It will be seen that in every case an increase in flow occurred, accompanied by a rise in rectal temperature. Where skin temperatures and blood pressures were also recorded, cutaneous vasoconstriction and a variable rise in blood pressure always followed the cold stimulus (Fig. 3 A). After the cessation of the stimulus, the rectal temperature, rectal blood flow, skin temperature, and blood pressure returned to resting levels. In every case the changes in rectal temperature were coincident with the changes in rectal blood flow. In a series of 25 experiments the rise in rectal temperature varied from 0.05° to 0.5° C.

Owing to the fact that the technique for measuring rectal blood flow was not quantitative it was impossible to determine whether the rectal temperature changes could be related to the extent of the blood-flow change.

To counter the possibility that venous return from the lower limbs might influence the results, the experiments were repeated with the circulation from the lower limbs occluded. Pressure cuffs around the thighs were inflated to 200 mm. Hg and the patient's left arm was placed in cold water. Cold stimulus still produced vasodilatation in the rectum accompanied by an increase in rectal temperature.

Effect of Decreasing Cold Stimulus

In 15 experiments the subject was initially exposed to the room air at 18–20° C. After the rectal temperature and blood flow reached equilibrium, cold stimulus was

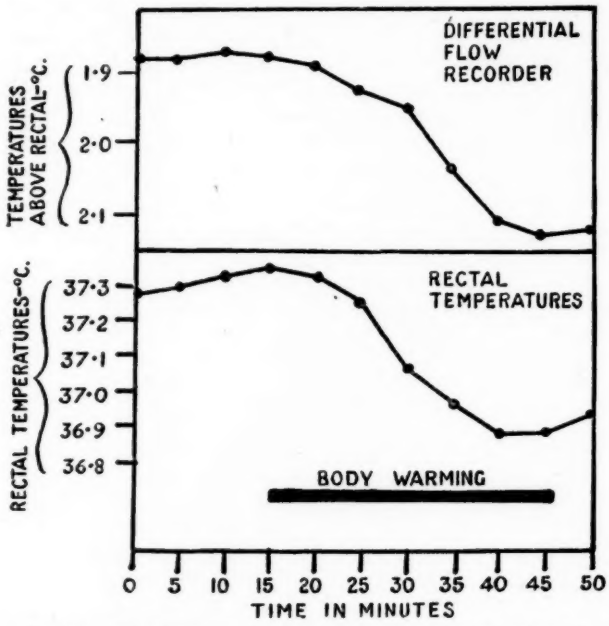

FIG. 2.—The effect on rectal temperature and rectal blood flow of removing cold stimulus from the body surface. Subject initially exposed to room air at 18° C.

removed from the body surface by covering with blankets. This procedure has been shown to produce vasodilatation in the skin (Grayson, 1951a) and vasoconstriction in the bowel of normal individuals (Grayson, 1949). In the present experiments blood flow in the rectum was recorded, using the heated thermocouple recorder. The temperature of the rectum and, in some cases, skin temperature from the periphery were also measured, using independent thermocouples. In Fig. 2 are shown the results of a typical experiment in which a fall in rectal temperature accompanied the fall in rectal blood flow. In all experiments the time relationships of the rectal temperature changes corresponded exactly with those of the rectal blood-flow changes.

Fig. 3 B shows the results of a typical experiment in which the skin temperature and the rectal temperature were recorded simultaneously. Again it will be seen that the rectal-temperature changes closely followed the skin-temperature changes.

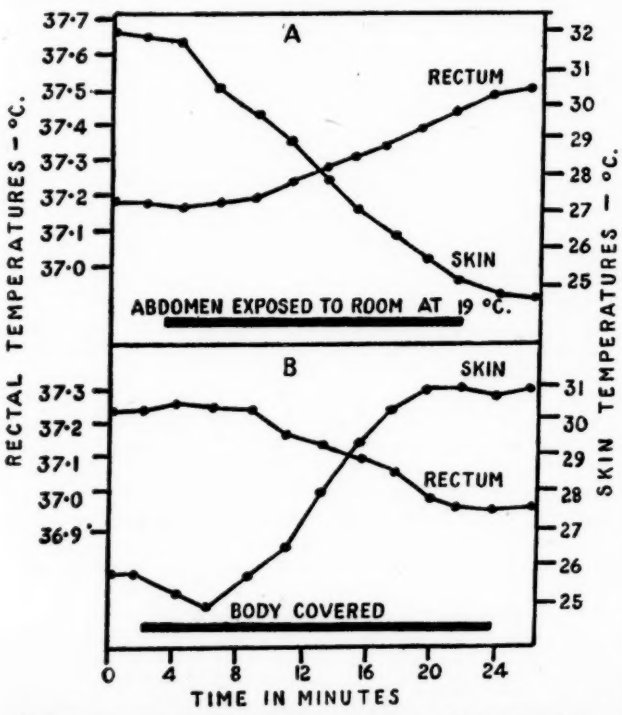

FIG. 3.—A comparison between rectal and skin temperatures. A. Cooling the surface of the body. B. Warming the surface of the body.

Effect of Intravenous Adrenaline on Rectal Temperature

In the experiments described above the bowel blood-flow changes were always accompanied by cutaneous blood-flow changes which were directionally opposed. A close consideration of the time relationships will be shown largely to discount the view that the cutaneous vascular changes could alone account for the changes in rectal temperature. None the less, it would have been desirable to employ a stimulus affecting the bowel circulation alone. Unfortunately, no such stimulus has been discovered. Indeed, in my view, alterations in blood flow in any organ must inevitably be accompanied by general circulatory adjustments. The intestinal vascular responses studied to date have been largely secondary to primary skin changes, but even bowel blood-flow changes which have been observed to occur in response to primarily intestinal stimuli are accompanied by cutaneous vascular changes.

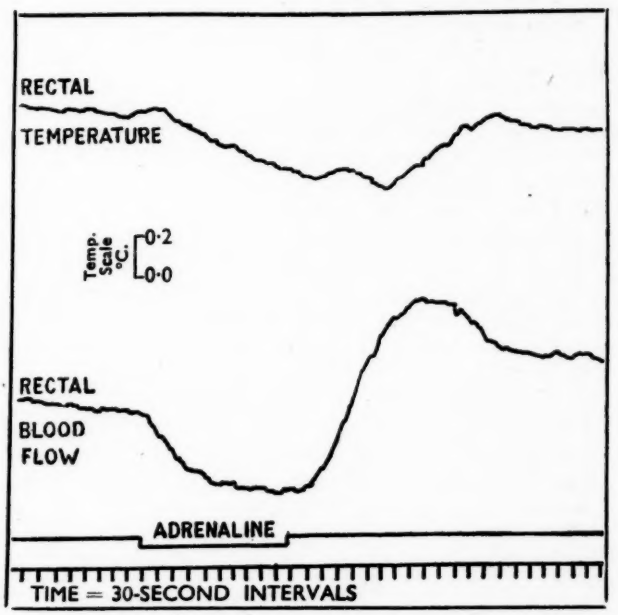

FIG. 4.—Effect of intravenous adrenaline tartrate—5 μg. a minute—on rectal temperature and blood flow. Tracing from original kymograph record. Rectal blood flow recorder.

Intravenously administered adrenaline, however, is a stimulus which produces the same type of change in the intestinal vessels as in the skin, causing vasoconstriction in both (Grayson and Swan, 1950). Thus it might be expected that if the rectal-temperature changes were due to an interference with the heat loss there would be a rise in rectal temperature, the more so in view of the stimulatory effect of adrenaline on metabolism.

In the experiment shown in Fig. 4 adrenaline was infused intravenously at the rate of 5 μg. a minute for five minutes, using a constant-speed infusion apparatus. It will be seen that a fall in bowel blood flow occurs as described previously (Grayson and Swan, 1950) accompanied by a fall in rectal temperature of 0.2° C. Similar

results were obtained in three other experiments, the rectal temperature drops being 0.15°, 0.2°, and 0.23° C. during five-minute infusions.

Discussion

In the experiments just described, vascular changes in the large intestine were often accompanied by temperature changes in the rectum. It must be remembered, however, that intestinal blood-flow changes are rarely, if ever, strictly localized. In most of the experiments which I have performed intestinal vascular changes have been a secondary result of cutaneous blood-flow changes. Thus intestinal vasodilatation was the result of cutaneous vasoconstriction and intestinal vasoconstriction was the result of cutaneous vasodilatation. It might be argued, therefore, that in most cases the changes in rectal temperature were true indications of a change in the heat equilibrium of the body and that the apparent relation to intestinal blood flow was purely coincidental.

Even without considering the experiments in which adrenaline was used it does not seem likely that this argument can be completely true. Most of the experiments described were short. The rise in rectal temperature was as rapid as the rise in rectal blood flow. Furthermore, when the stimulus was withdrawn the return of rectal temperature to resting levels was as complete and rapid as the return of the rectal blood flow to resting levels. Again, in Fig. 3 it will be seen that the changes in rectal temperature began at practically the same time as the changes in skin temperature. It seems unlikely that changes in heat balance could be so rapid or could so accurately follow the changes in intestinal flow.

The experiments in which adrenaline was used confirm that rectal temperature can be raised or lowered by increasing or diminishing the blood flow. In so far as the action of adrenaline is to produce cutaneous vasoconstriction and increased metabolism it might be anticipated that, if anything, the general body temperature would rise. In fact, as has been shown, adrenaline administered for a short period produces a slight fall in rectal temperature accompanying a diminution in rectal blood flow. It must be concluded, therefore, that the rectal temperature itself, like the temperature of more peripheral tissues, can be affected directly by blood-flow changes.

This implies, further, the existence of a temperature gradient between the rectum and the afferent blood. Thus, in some subjects, changes of up to 0.5° C. were produced in rectal temperature by purely circulatory stimuli. The temperature of the blood supplying the rectum in these individuals must have been more than 0.5° C. higher than the resting rectal temperature. Therefore, although the observations of Bentley and Grayson, already referred to, showed that the rectal temperature was as high as the temperature immediately beneath the peritoneum, temperature gradients of the type described in other species by Wiggers and Orias and by Federov and Shur must exist in the peritoneal cavity of the human subject.

In conclusion it should be emphasized that the changes in rectal temperature with which we have been concerned were usually small in relation to the wide variation met with clinically and even physiologically. It is not claimed that blood-flow variations seriously affect the clinical interpretation of rectal-temperature changes. The present work simply demonstrates that rectal temperature, albeit a useful clinical indicator, is not truly representative of the temperature at which the body's tissues function. The fact that it can be affected by blood-flow changes demonstrates that it is not even the highest temperature in the body; it is simply one stage in the temperature gradient which exists between the organs of heat production and the organs of heat dissipation.

Summary

The simultaneous recording of rectal temperature and rectal blood flow showed that external stimuli of heat and cold caused changes in rectal temperature coincident with the changes in rectal blood flow.

Intravenous adrenaline produced diminution in rectal blood flow, skin temperature, and rectal temperature.

The evidence is regarded as indicating that intestinal blood-flow changes can cause changes in rectal temperature analogous to the changes produced in skin temperature by changes in skin blood flow.

It is argued that the temperature of the blood flowing to the rectum must, in some subjects at least, be considerably higher than the actual temperature of the rectum.

This work was performed during the tenure of a British Medical Association Research Scholarship. I am indebted to Professor F. H. Bentley and to Professor R. J. Brocklehurst for their interest and advice.

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A report in the *New York Times*, November 26, describes the progress being made towards the control of chemicals in foodstuffs in the United States. A Congress Select Committee of seven members has been meeting regularly for about a year to hear evidence from people in medicine and industry, and hopes to be able to issue a report with recommendations after its final hearings in New York in January. At its recent sessions in Los Angeles it considered insecticides and heard a pathologist report that in 19 out of 20 routine post-mortem examinations traces of chlorinated hydrocarbon insecticides were also found in the bodies when the appropriate chemical tests were made, although in no case was the cause of death poisoning by insecticide. Chlordane was very dangerous anywhere near food, but parathion and D.D.T. were without risk. The committee also considered risks from oestrogenic hormones. No evidence was found that these substances were harmful used in cosmetic face creams, but their use in caponizing poultry was potentially dangerous. Birds for sale in the poultry market as food had been found to contain as much as 15 mg. unassimilated stilboestrol—seven times the human dose. (These capons are eunuchoid cockerels which have been treated with female hormones by subcutaneous implantation of a tablet to make them fatter and their flesh softer and juicier. A cockerel starting treatment at 9 weeks old may weigh half a pound more and require 6% less food at 20 weeks—eating time—than a control untreated bird.)

A NEW EXAMPLE OF THE ANTI-S AGGLUTININ

BY

J. J. van LOGHEM, jun., M.D.

Mia v. d. HART

(Blood Grouping Laboratory, Amsterdam)

AND

J. CORNELIS, M.D.

(Department for Internal Diseases, Hospital "Ziekenzorg," Wageningen)

According to the latest information of Race and Sanger (1950) seven examples of the antibody anti-S are known. In two cases this antibody was apparently caused by iso-immunization during pregnancy. The first example was described by Walsh and Montgomery (1947), and the other by Mary Pickles (1948). A naturally occurring antibody anti-S was found in the serum of a patient by Coombs *et al.* (1951) and in the blood of a donor by Vogel and Rosenfield (see Race and Sanger, 1950). In three cases the formation of anti-S was the result of multiple transfusions (Cutbush and Mollison, 1949; Race *et al.*, 1949; Collins *et al.*, 1950).

If the antibody was formed by immunization during pregnancy or blood transfusion one or more other immune antibodies, mostly anti-D, were present in the serum.

In our example the antibody was found in the serum of a woman suffering from a severe chronic anaemia, apparently due to osteosclerosis of the bone marrow. The anaemia was treated for the first time in 1933 after delivery of her first child. The administration of medicaments (iron, copper, liver extracts) was not successful. After delivery of the second child she received her first transfusion of 350 ml. of blood from her husband. This was followed by a rise in temperature and chills. The clinical effect of a second transfusion with 175 ml. of blood, given one month afterwards, is unknown. The first and second pregnancies ended with delivery of a normal child. The third pregnancy, in 1940, also terminated with the birth of a healthy child.

In February, 1940, the patient was treated again for her anaemic condition (see Table). She received eight intramuscular injections of blood and seven transfusions. The effect of one of these transfusions is unknown. The third did not cause any ill effect, but all the others resulted in mild febrile or allergic reactions (Quincke's oedema or urticaria) The last transfusion was followed by a haemolytic reaction with rise of temperature (40° C.), chills, dyspnoea, and haemoglobinuria. During that time difficulties were observed in determining the blood group owing to the presence of an irregular antibody in the patient's serum.

In 1950 the patient was readmitted to the hospital (Wageningen) and treated with blood transfusions. The haemoglobin level was 34%, red cell count 1,400,000, diameter of red cells 6.9 μ, white cells 2,400; the bilirubin content was slightly increased (method of Hijmans van den Bergh) 1.6 units. Sternal puncture failed as in previous trials. This was apparently due to the fact that the corticalis was enlarged, as was found in 1937 by *x*-ray examination of other bones (upper and lower extremities).

The first transfusion with group A blood, given in October, 1950, was stopped after infusion of 100 ml. because of severe abdominal pain and chills. Three days later a second transfusion of 250 ml. of group A blood was administered, which was followed, about one hour later, by chills.

As the red cells of different donors of group A agglutinated the serum of the patient, the blood was more thoroughly investigated in the Blood Grouping Laboratory in Amsterdam.

The patient's blood group was: A MMss cde/cde Fya+. In the patient's serum were found the following antibodies: anti-C in saline 1 : 512; anti-D in saline 1 : 512; anti-S in saline 1 : 16. The titres of these anti-

Record of Blood Transfusions and Injections

Date	Quantity of Blood ml.	Type of Blood	Method of Admin.	Reaction	Hb Level %	Antibodies	
						Anti-Rh	Anti-S
19/11/36	350	O CDe/cdE ss (husband)	I.V.	Chill	60	n.i.	n.i.
18/12/36	175	O Rh?	I.V.	?	60	n.i.	n.i.
1/2/40	20	?	I.M.		23		
3/2/40	20	?	I.M.		?		
5/2/40	20	?	I.M.		30		
7/2/40	20	?	I.M.	Febrile reactions (39·5° C.) and abdominal complaints	?		
9/2/40	20	?	I.M.		30		
11/2/40	20	?	I.M.		?		
13/2/40	20	?	I.M.		24		
15/2/40	20	?	I.M.		22		
17/2/40	100	A Rh?	I.V.	Mild febrile	21	n.i.	n.i.
28/2/40	450	A Rh?	I.V.	" "	25	n.i.	n.i.
8/3/40	450	A Rh?	I.V.	None	27	n.i.	n.i.
14/3/40	300	A Rh?	I.V.	Quincke's oedema	30	n.i.	n.i.
22/3/40	300	A Rh?	I.V.	Urticaria	40	n.i.	n.i.
1/4/40	?	?	I.V.	?	?	n.i.	n.i.
10/4/40		?	I.V.	Chill and fever, dyspnoea, haemoglobinuria	28	n.i.	n.i.
4/10/50	100	A Rh?	I.V.	Chill, malaise	35	n.i.	n.i.
9/10/50	250	A Rh?	I.V.	" "	35	Anti-D 1 : 512 Anti-C 1 : 512	*1 : 16*
26/10/50	500	A cde/cde ss	I.V.	None	30		
26/10/50	*20*	A cde/cde *S*	I.V.	(*Febrile 39° C.*)			
27/10/50	1,000	A cde/cde ss	I.V.	None	40		*1 : 4*
31/10/50	500	A cde/cde ss	I.V.	"	45		*1 : 32*
3/11/50	500	A cde/cde ss	I.V.	"	50		
4/11/50	1,000	A cde/cde ss	I.V.	"	57		
7/11/50	1,000	A cde/cde ss	I.V.	" General condition ameliorated	68		
7/11/50	*10*	A cde/cde *S*	I.V.	None			
9/11/50	1,000	A cde/cde ss	I.V.	"	60		
12/11/50							*1 : 64*
21/12/50							*1 : 4*

bodies were not higher with the albumin/serum method and the indirect anti-human-globulin test. After heating the serum for 10 minutes at 70° C. incomplete antibodies anti-C and anti-D were found, titre 1 : 256, but no incomplete antibodies of the type anti-S could be detected with the albumin/serum method, indirect anti-human-globulin, or trypsin technique.

In the period from October 26 to November 7, 1950, the patient received 4,500 ml. of A, Rh-negative, S-negative blood. No reaction occurred, and the haemoglobin level increased from 35 to 60%. The titre of the antibody anti-S had decreased from 1 : 16 to 1 : 4.

Apart from the transfusions of A, Rh-negative, S-negative blood, the patient received on October 26 20 ml. of A, Rh-negative, S-positive blood, which resulted in a febrile reaction (39° C.). Four days later the titre was 1 : 32. Twelve days after this first attempt of artificial immunization 10 ml. of Rh-negative S-positive blood was given again, this time without causing any reaction. Five days later the titre had increased to 1 : 64.

Reinvestigation of the serum on December 21 revealed a decrease in titre to 1 : 4.

Determination of the blood groups of husband and children revealed the following facts.

Husband	O CDe/cdE ss
1st child, born in 1933	O CDe/cde ss
2nd ,, ,, ,, 1936	O cdE/cde ss
3rd ,, ,, ,, 1944	O cdE/cde ss

From these findings it was concluded that the formation of anti-S was not due to immunization during pregnancy but to blood transfusions.

It is highly probable that the reaction following the first transfusion with blood of the husband was caused by Rh antibody formation during the first pregnancy, although this first child showed no symptoms of haemolytic disease. The birth of two normal children afterwards was apparently due to the lack of D (and C) antigen in their red cells.

Summary

A patient suffering from a severe chronic anaemia, probably due to osteosclerosis of the bone marrow, received in a period of 14 years 11 blood transfusions, most of them causing mild or severe reactions, and 8 intramuscular injections of whole blood.

In the serum was found, besides complete and incomplete antibodies anti-C and anti-D, a saline-agglutinating antibody of the type anti-S. This agglutinin is apparently of the immune type, because the titre, after administration of two intravenous injections of S-positive blood (respectively 20 and 10 ml.) increased from 1 : 4 to 1 : 64, and fell again after the artificial immunization was stopped. The first injection with S-positive blood was followed by a febrile reaction. Rh-negative S-negative blood was well tolerated.

No incomplete anti-S antibodies were detected.

This is the eighth case in which the anti-S agglutinin was found and the fourth case in which the formation was due to immunization by blood transfusion.

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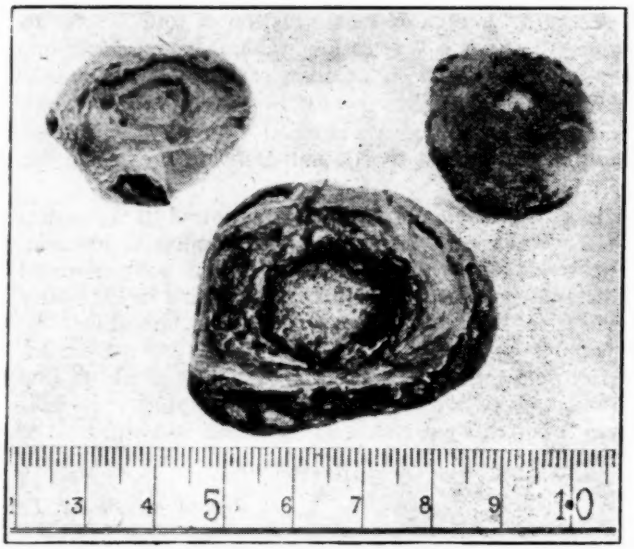
Medical Memoranda

Enteroliths of Small Intestine

True enteroliths of the small intestine are rare. De Witt *et al.* (1943) described a case and mentioned seven others reported in the literature. Since that date Dearing *et al.* (1944) reported a case which was the only one in the records of the Mayo Clinic, while Sten Grettve (1947) has since reported another.

Case Report

A spinster aged 44 was admitted as an emergency case complaining of abdominal pain of about five hours' duration, which had begun in the region of the umbilicus and then became localized to the right iliac fossa. Vomiting had occurred after the onset of the pain and there had been a little diarrhoea. She stated that she had had a number of similar attacks over the past few years, but that they had become more frequent in the last 12 months.



Photograph of the enteroliths

On admission her temperature and pulse were normal, and there was tenderness and slight guarding in the right iliac fossa.

The abdomen was explored through a right lower paramedian incision. The small intestine about 2 ft. (60 cm.) from the caecum was found to be dilated to the size of a normal stomach, whilst the wall was hypertrophied to a far greater thickness than that of a stomach. At each end of the dilatation there was a slight constriction of the gut, and this prevented three enteroliths enclosed in this section from being passed proximally or distally. The mesentery to this area of gut was heavily infiltrated with fat, as was the adjacent subserosa. The enteroliths were removed through the hypertrophied wall of the gut and the patient made an uneventful recovery. The largest stone was oval in shape with biconcave lateral surfaces, into which the two smaller ones fitted accurately, thus suggesting that they had originated by splitting off from the larger one.

On further questioning the patient stated that from the time she first started going to school at the age of 5 she could remember having similar attacks of abdominal pain, for which her mother used to put her to bed for a few days, following which she would be perfectly well for a year or so. These attacks had become more frequent in recent years.

The patient has been followed up for four years. There have been no further attacks, and she has been in good health.

Investigation of the alimentary, renal, and biliary tracts revealed no possible source of origin of the enteroliths. Biochemical analysis indicated that they were composed mainly of organic debris, with some fat and lipoid matter, and a moderate amount of calcium and magnesium phosphates.

H. J. RICHARDS, M.B., D.A., F.R.C.S.

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Discharge of Foetal Bones by the Rectum

Case Report

A primigravida aged 23 sought medical advice on May 15, 1950, complaining of having had severe lower abdominal pain for the previous seven days. She was approximately 20 weeks pregnant by her dates.

On examination a tender tumour was found arising out of the pelvis to within two fingerbreadths of the umbilicus. There was no vaginal haemorrhage. A pelvic examination under general anaesthesia was then carried out, and it was decided to terminate the pregnancy. A Drew Smythe catheter was accordingly passed through the cervix into the uterine cavity. It was felt to pass through the wall of the uterus before it was removed. Uterine bleeding followed immediately, but no liquor amnii was withdrawn. On May 16 and 17 the patient's condition rapidly deteriorated, and on May 18 she was admitted to the Royal Salop Infirmary with a diagnosis of general peritonitis.

Her general condition was then extremely poor. The abdomen was distended, rigid, and uniformly tender to palpation. No intestinal sounds were audible. There was no vaginal discharge. She was treated by gastric suction, continuous intravenous saline drip, and the administration of streptomycin and morphine. A blood count on May 22 showed: Hb, 40%; red cells, 2,600,000 per c.mm.; white cells, 14,000 per c.mm. (77% neutrophil polymorphs). After a blood transfusion of 2 pints (1.14 l.) the haemoglobin rose to 60%. At this time no pathogenic organisms were isolated from a catheter specimen of urine, but vaginal swabs showed a heavy contamination with *Bact. coli*.

A week after admission the patient's condition had improved, though the temperature still ranged between 100 and 102° F. (37.8 and 38.9° C.). The Friedman test was positive and remained positive until June 5. An *x*-ray film taken at this time revealed a single foetus, estimated at 17 to 20 weeks old. It was thought to be dead and associated with an abscess, either of the uterine wall, of the pelvic cellular tissue, or of the peritoneum. Operative measures were postponed until the patient's general condition should improve or the abscess point into vagina or rectum.

By repeated blood transfusion the haemoglobin was maintained at 60%. The white blood cells remained at 14,000 per c.mm. A moderate growth of *Bact. coli* was obtained on urinary culture, but blood cultures were sterile. Despite the administration of penicillin and "aureomycin" the temperature constantly rose, maintaining its swinging character until, by June 30, it had reached 105° F. (40.6° C.). On the following day offensive pus suddenly appeared in the urine in great quantity, and suction drainage of the bladder by means of White's apparatus was instituted via an indwelling catheter. From this time onwards the patient made a slow but steady recovery.

On July 5, however, she had a moderately severe diarrhoea and two days later passed a foetal tibia by the rectum; a few days later still she noticed the occasional passage of flatus by the urethra. A radiograph taken at this time failed to show any foetal bones. A month later, though the patient was very much better, the abdominal and pelvic signs were unchanged and the passage of flatus by the urethra continued, and on September 14 it was possible, on bimanual examination, to distinguish a normal-sized uterus clearly separate from an abdomino-pelvic tumour, which still extended to within two fingerbreadths of the umbilicus. This made a diagnosis of advanced extrauterine pregnancy certain.

On September 26 the abdomen was opened under general anaesthesia, through a midline sub-umbilical incision. An ectopic sac, the size of a grape-fruit, was found situated above the body of the uterus. The posterior wall of the sac was firmly adherent to coils of intestine, and its anterior wall was intimately blended with the wall of the bladder. The uterus appeared normal. No trace of the left Fallopian tube or ovary could be found. There was a right tubo-ovarian cyst. In an attempt to separate coils of intestine from its wall the ectopic sac was torn through, exposing foetal bones and placental debris within. The foetal bones, the placental debris, and most of the wall of the sac were removed, but no attempt was made to remove that part of the sac wall which was blended with the bladder. A small fistula of the lower ileum, through which the latter had communicated with the cavity of the sac, was found and closed. The right tubo-ovarian cyst was removed, conserving such healthy ovarian tissue as remained. The wound was closed with drainage, and an indwelling catheter was inserted into the bladder.

The patient was discharged from hospital on the 25th day after operation. Three weeks later she was symptom-free and the wound was healed.

Comment

Although Gould and Pyle (1898) state that discharge of foetal bones or even the whole of an extrauterine foetus by the rectum is not uncommon, and quote 22 cases from the literature of 1731 to 1886 in support of their statement, few cases have been reported in the literature of the twentieth century. While the majority of such cases are due to the presence of an advanced extrauterine pregnancy, previous gross trauma to the birth canal may on rare occasions lead to a similar result.

Perry and Saltzman (1938) report an interesting case of delivery through the rectum of a foetus of 5 months which was extrauterine. Illustrative of a traumatic cause is the rare case of a native Indian woman in whom the cervix of the uterus opened into the rectum, and a normal intrauterine pregnancy terminated at term in a rectal delivery (Patel, 1937). Although it is theoretically possible for the cervix to enter the rectum as a developmental abnormality, it is far more probable that severe trauma at a previous birth had resulted in this anomaly.

Preston (1937) reports a case in which gross scarring of the lower end of the vagina due to ritual circumcision resulted in so severe an obstruction to a vaginal delivery at term that the foetus was born by the rectum.

I am indebted to Professor Chassar Moir, Mr. Charles Read, and Mr. S. Davidson for their kind interest in my case. My thanks are also due to Mr. J. A. Baty, who provided me with the notes he made while the patient was under his care, before she was transferred to the gynaecological department.

VIVIAN H. BARNETT, M.B., F.R.C.S., M.R.C.O.G.
Royal Salop Infirmary, Shrewsbury.

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Reviews

THE ACRIDINES

The Acridines. Their Preparation, Physical, Chemical, and Biological Properties and Uses. By Adrien Albert, D.Sc., Ph.D., B.Sc., F.R.I.C. (Pp. 381. £3 10s.) London: Edward Arnold. 1951.

Professor Albert has collected the many important original contributions made by himself and his co-workers on the synthesis, physical chemistry, and antiseptic properties of aminoacridine compounds, and the relations between physicochemical characters and antibacterial action. In addition, he has produced a monograph dealing with practically everything that is known of the chemistry, biological properties, and medical applications of members of the acridine series. The work is divided into four parts, concerned respectively with preparative methods, physical and chemical properties, biological properties and uses, and other uses, this last including such varied topics as the use of acridines in dyeing, relations between colour and chemical constitution, the use of acridines in analytical work, their fluorescence, and, in certain instances, chemiluminescence. An appendix is devoted to the manipulation and purification of acridine compounds.

The first attempts at medical applications were those of Auclert (1888), who found that chrysaniline had a certain, although unreliable, analgesic effect and when taken internally was mydriatic, and of Mannaberg, who tested chrysaniline derivatives for antimalarial action but found this unreliable. Ehrlich, in connexion with his studies on chemotherapy of trypanosomiasis, commissioned Benda to prepare trypaflavin, a quaternary diamino-acridine derivative, which proved to be highly effective against *T. brucei* in mice. Then Browning and Gilmour showed that this compound, later known as acriflavine, and its precursor, proflavine, were powerfully inhibitory toward both Gram-positive and Gram-negative bacteria in a medium such as peptone water, and also that, contrary to most of the powerful antiseptics then known, they were not reduced in their antiseptic potency by the presence of blood serum. In the war of 1914–18, when sepsis was so serious a problem, these substances were widely used in wound dressings. They proved to be powerful in combating local infections and relatively innocuous to the tissues, although prolonged application interfered with healing. Albert introduced "aminacrine" (5-aminoacridine), which has all the desirable properties of the class and is practically colourless. He showed that the antibacterial action of members of the group is highly correlated with their basicity, and has also emphasized that solutions of salts applied to the tissues should not have an acid *p*H. The aminoacridines have enjoyed a long term of clinical use as antibacterials, and it is noted that in 1946–7 the annual production was 20 tons in England and 1½ tons in Australia. It is of interest, too, that mepacrine, the valuable quinine substitute, is an acridine derivative.

The chemical sections are on the preparation and properties of acridines, acridans, acridones, and their derivatives. The preparative section is notable for clarity and detail of statement and for frequent critical appraisal of the procedures described.

This book is stated to be the first devoted solely to the acridines; it is well documented, and an excellent author-reference index is supplied. References are run in the text and are also set in many of the 99 tables in which textual matter is summarized and extended. The exposition is most stimulating, and those interested in any aspect of the subject will find a rich store of information

C. H. BROWNING.
A. B. CRAWFORD.

PAEDIATRIC EMERGENCIES

Handbook of Pediatric Medical Emergencies. By Adolph G. DeSanctis, M.D., and Charles Varga, M.D. (Pp. 284; illustrated. £1 15s.) London: Henry Kimpton. 1951.

Imagine yourself dealing with a paediatric emergency, perhaps a case of drowning or poisoning or a convulsion. Perhaps you know exactly what to do; but, even if you do not, you may still claim to possess Samuel Johnson's second kind of knowledge—where the information may be found—if you have heard of this handbook, which is a mine of detailed instruction crammed into 274 pages of a well-produced and suitably illustrated volume. "But," you say, "is it likely to be much help to me in my practice, because my patients are British children?" Never mind, the emergencies arising during most illnesses take no notice of the Atlantic; and in regard to medical "accidents" the British child will not be likely to score off his American cousin in thinking out ways of getting into trouble—perhaps least of all in the matter of poisoning, for an appendix to this volume lists the names and basic constituents of some 500 commercial sources that are available to the go-getter, and many with names such as "Pharaoh's serpent," "diweevil," and "bug ded" that simply ask for trouble when precocious children are about. But do not go away with the idea that this handbook deals only, or even mainly, with accidental emergencies, for it covers the ordinary illnesses and abnormal states in childhood that call for urgent treatment, such as diarrhoea, meningitis, asphyxia of the newborn, and uraemia. If you can claim a good deal of paediatric experience, you may perhaps want to argue with the authors about some of their recommendations, but on the whole you will approve and be grateful for this storehouse of useful information of the sort that no one should try to pack into his brain.

But let us suppose that you have had little experience of paediatrics, and turn in your (relative) ignorance to this book for help. The best advice to you is to be very cautious lest you are tempted to confuse information with wisdom, and to believe that tactics—no matter how perfect—can be sure of winning a campaign that lacks experienced strategic direction. Behind the junior practitioner who uses this book there should be—as at the Pediatric Department of the New York University Bellevue Medical Centre, where the book was born—experienced paediatricians to give such guidance as may be needed in the choice and timing of remedies and to protect the patient from excessive, overzealous treatment.

It is a pity that the authors thought fit to include scraps of "potted" clinical medicine here and there. They strike a false note, and those that are not mere medical platitudes may indeed be dangerous in their brevity and authoritative finality. The section on convulsions is excellent and might well be used by the authors as a model for all the other sections.

NORMAN B. CAPON.

ASTHMA AND CATARRH

Bronchial Asthma. Its Relation to Upper Respiratory Tract Infection. By R. J. Whiteman, M.B., Ch.M.(Syd.), F.R.A.C.S. (Pp. 184. 15s.) London: H. K. Lewis and Co. 1951.

The author believes that sinus infection and associated "nasal catarrh" is of paramount importance in all cases of asthma. His views are based on experience gained over a period of twenty-five years. The treatment recommended is as follows: (1) The patient is put to bed in a constant temperature for a period of several weeks. Bilateral antrostomy is carried out and followed by antral wash-outs with normal saline. Menthol and eucalyptus must be inhaled for several hours daily, and this must be continued for four to six weeks after leaving hospital. (2) At the first sign of a "cold" he must return to bed and inhale as before. He must remain in bed until all evidence of "catarrh" has completely gone. It is claimed that if this treatment is conscientiously carried out the results are "almost invariably successful." A number of case histories are quoted in evidence. Failure is attributed to lack of full co-operation by the patient.

There is a great deal of repetition, which makes the book dull reading. The author's statements are didactic and based on insufficient evidence. For example, he states (p. 27): "There is no hesitation in saying that any kind of chronic nasal discharge is almost invariably due to sinus infection. . . ." No distinction is made between catarrh due to infection, allergy, or other causes. "The absence of proof by lavage and *x*-rays cannot be regarded at this stage as sufficient evidence to exclude an antral infection" (p. 27). "In cases of nasal catarrh in which gross evidence of antral infection has been absent, it has been customary to take their symptoms alone as evidence that their antra are infected" (p. 27). And, finally, "no special investigation either by lavage or *x*-ray was made of the antra as the object of the Clinic was to carry out this treatment for catarrh, the presence of which was taken to be indicated by the asthma attacks and other symptoms regarded as being secondary to it" (p. 59). A number of symptoms, including train sickness, bilious attacks, loss of appetite for breakfast, dizziness, mental anxiety, and a pasty complexion, are attributed to the toxaemia that accompanies catarrh.

The effective treatment of infected antra and the prevention of colds are of undoubted value in the treatment of asthma, and in the author's hands the methods he recommends appear to have achieved remarkable success. It is difficult not to believe that he has overstated his case, but if results even half as good can be obtained by others in suitably selected cases the treatment is well worth a trial.

R. S. BRUCE PEARSON

RESEARCH METHODS

Methods in Medical Research. Volume 4. Edited by M. B. Visscher. (Pp. 306. $7.) Chicago: Year Book Publishers. 1951.

The editors of this series believe that, with the growth of specialization in medicine, it is desirable to provide a means whereby persons who have had large practical experience of research techniques can give detailed descriptions of them. The field is a large one and will provide material for an annual volume as far ahead as can be seen. This volume is more closely related to the work of the clinical scientist than were its predecessors.

The first section is on histochemical staining methods and shows how much detailed knowledge of cell constituents can be obtained in this way. The next section, on fluid and electrolyte distribution, deals with a field which has been the subject of intensive research. The third section, on gastro-intestinal investigation, raises the question why, in gastro-enterology, there have been no advances in the last 20 years comparable to those made in the study of diseases of the heart and lungs. This seems to depend on a failure to invent or apply new methods of study. "Perhaps it may reflect a paucity of inspiring research leaders; or a major cause may be reluctance to apply techniques with appeal to young investigators." The final section is about tissue culture methods which, after a period of relative quiescence, have come to the forefront again as tools of investigation. Like previous volumes in the series, this book is handy and readable. An agreeable feature is the occasional reviewers' comment interspersed in the text.

L. J. WITTS.

BOOKS RECEIVED

Review is not precluded by notice here of books recently received

A Seventeenth Century Doctor and His Patients: John Symcotts, 1592?–1662. By F. N. L. Poynter and W. J. Bishop. (Pp. 126. 25s.) Streatley, Bedfordshire: Bedfordshire Historical Record Society. 1951.

More About Psychiatry. By C. Binger, M.D. (Pp. 201. 10s. 6d.) London: George Allen and Unwin. 1951.

The Croonian Lectures on Muscular Movements and Remarks on Paralysis of the Movements of the Trunk in Hemiplegia. By the late Dr. Charles Beevor. (Pp 79. 5s.) London: Macmillan. 1951.

Cornell Conferences on Therapy. Edited by H. Gold, M.D., and others. Vol. 4. (Pp. 342. 26s.) London: Macmillan. 1951.

Immunology. By N. P. Sherwood, Ph.D., M.D., F.A.C.P. 3rd ed. (Pp. 731. 56s.) London: Henry Kimpton. 1951.

The Concise Book of Medicine. By A. Bose, M.B., B.S. (Pp. 370. 25s.) Calcutta: Dr. A. Bose, 35, Keshap sen Street. 1951.

Methods in Medical Research. Edited by M. B. Visscher. Vol. 4. (Pp. 306. $7.) Chicago: Year Book Publishers. 1951.

Electron Microscopic Histology of the Heart. By B. Kisch, M.D. (Pp. 106. $5.50.) New York: Brooklyn Medical Press. 1951.

The Catholic Doctor By Father A. Bonnar, O.F.M., D.D., M.Sc. (Pp. 179. 12s. 6d.) London: Burns, Oates and Washbourne. 1951.

Origin and Evolution of Man. Cold Spring Harbor Symposia on Quantitative Biology. Vol. 15 (Pp. 425. $7.) Long Island, New York: The Biological Laboratory, Cold Spring Harbor. 1950.

A recent leading article in these columns (1951, 1, 931) explained the present role of ultrasonics in diagnosis and therapy. *Supersonics or Ultrasonics*, a bibliography compiled by staff of the Research Foundation, Oklahoma Agricultural and Mechanical College, Stillwater, Oklahoma, provides an exhaustive list of papers on all aspects of ultrasonic energy, and covers the years 1926 to 1950. It is classified under more than 80 subject headings, with a separate listing under authors' names. Topics of medical interest include the effect of ultrasonics on bacterial and virus structure, haematological, histological, immunological, pathological, and physiological effects, and therapeutic application. The bibliography comprises 283 pages and is available from the Foundation, price $2, post paid.

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THE TREATMENT OF PNEUMONIA

New facts about the causes of pneumonia, as well as the arrival of the newer antibiotics, have created fresh problems in diagnosis and treatment and have led to some uncertainty about the best action to take when pneumonia is diagnosed in the patient's home. The problem from the practitioner's point of view is simply this: What is the best treatment for a patient diagnosed, on clinical grounds, as having pneumonia, and when should such a patient be referred to hospital for treatment? Elsewhere in this issue of the *Journal* we publish three reports which help to answer these important questions. On page 1361 a subcommittee of the Medical Research Council, under the chairmanship of Dr. J. G. Scadding, reports the results of an investigation into the efficiency of the newer antibiotics, "aureomycin" and chloramphenicol, compared with that of penicillin and sulphonamides in the treatment of patients admitted to hospital with a diagnosis of pneumonia (the diagnosis having been subsequently confirmed). The cases treated by each method were comparable in all important respects, and the results of treatment were assessed both clinically and radiologically. Of the pneumonic infections so treated almost 90% were later found to be bacterial in origin. The subcommittee concludes that penicillin is just as good as, or possibly better than, either aureomycin or chloramphenicol in the treatment of clinical pneumonia. Moreover, aureomycin and chloramphenicol caused unpleasant toxic effects in about one-quarter of the patients to whom they were given, a drawback which outweighs any advantage gained from the easy administration of these expensive drugs by mouth.

In domiciliary practice it is sometimes considered a disadvantage to use penicillin, since it must be given by repeated injections, thus taxing yet further the overburdened resources of doctor and nurse. A few years ago, however, Anderson and Landsman[1] reported that penicillin was efficacious in the treatment of lobar pneumonia when given by mouth in adequate doses. On page 1365 Drs. M. B. Eadie, N. R. Grist, and J. B. Landsman examine more fully the use of oral penicillin by comparing the results of such treatment with those of aureomycin in a similar series of cases of pneumonia. The results of this investigation show that aureomycin was no better than penicillin in the treatment of the average case of pneumonia when both drugs were given by mouth.

The timely publication of these two reports should prove a valuable guide to practitioners during the coming winter. It is important to remember, however, that these conclusions apply only to the "average" case of pneumonia. Among the well-known factors which adversely affect the prognosis in pneumonia are age, alcoholism, and the concurrence of cardiovascular or chronic respiratory disease. Both the Medical Research Council and the Glasgow workers recognize that the exceptional case requires exceptional treatment: the patient with pneumonia who is desperately ill or who has complications of the disease must be given that treatment which will be most quickly effective. In such cases there is a distinct advantage in giving penicillin by injection in the early stages, and there is good reason to suppose that the use of other drugs in combination with penicillin may be helpful. Again, the need remains for constant skilled nursing of patients who are seriously ill with pneumonia, and this, as well as oxygen therapy, is often more readily available in hospital than at home. There seems to be every justification for transferring to hospital those patients who are gravely ill, and those who have complications or who fail to respond to treatment, but the injection of a large first dose of penicillin should not be delayed for this reason.

The outcome of pneumonia depends to a great extent on the particular type of disease from which the patient is suffering. We have recently commented on the increasing interest in non-bacterial pneumonias, and on the difficulties of classifying the condition accurately in certain cases.[2] In another article in this issue a team of workers at the Postgraduate Medical School and the Central Public Health Laboratory analyse the results of a year's study of the aetiology of pneumonic conditions in patients admitted to the Hammersmith Hospital, London. Of 110 cases, the pneumonia was of lobar distribution in 62; of the remainder about half were segmental and half lobular. The anatomical distribution of the pneumonia was not related to the bacterial findings, but lobar pneumonia was commoner in older patients, whereas most of the patients with segmental pneumonia were under the age of 40. In 58 cases it was possible to obtain bacteriological evidence of the cause, half of these being

1 *British Medical Journal*, 1947, **2**, 950.
2 Ibid., 1951, **2**, 1018.
3 Ramsay H., and Scadding J. G., *Quart. J. Med.*, 1939, **8**, 79.
4 Scadding, J. G., *Lancet*, 1948, **1**, 89.

pneumococcal and about one-sixth staphylococcal in origin. There were only two cases of Q fever and three possible cases of psittacosis, but ten patients showed a significant increase in cold agglutinins and three of these responded immediately to aureomycin. It is of interest to see that no specific organism was found in 52 of the cases investigated, but about half of these were probably examples of lobar pneumoccocal pneumonia in which the bacteriological findings were masked by chemotherapy or from which bacteria were not obtained for technical reasons. There is good evidence that most of the remaining patients had "aspiration pneumonia."[2 3 4]

To determine exactly the aetiological agent in pneumonic diseases is no easy task, and diagnosis is often made retrospectively. Indeed, as Crofton and his colleagues state, full investigation of a series of cases is now a formidable undertaking. The treatment of pneumonia, therefore, especially in the early stages, depends largely on bedside examinations. It is evident from this series of cases that pneumonias of virus origin are uncommon in this country, and failure to respond to treatment should not be regarded as an indication to diagnose virus pneumonia. Persistence of fever and unusual signs in patients with pneumonia are indications for further investigations: it must always be remembered that more serious complaints often masquerade under the clinical description of "pneumonia."

DENTAL DISEASE AND GENERAL HEALTH

Almost an entire issue of the *Journal of the American Dental Association* is devoted to "An Evaluation of the Effect of Dental Foci of Infection on Health."[1] This is an anonymous review prepared under the direction of the Council on Dental Health of the Association, fully documented, dealing first with the theory of focal sepsis generally, then with the diagnosis of dental root sepsis by radiological, bacteriological, and other means, and finally with the evidence that such sepsis can be responsible for disease in any of five situations elsewhere. The literature cited is very extensive and goes well outside dental pathology into spheres where the writer seems sometimes to be on unfamiliar ground, but the collected information about studies of dental sepsis itself is comprehensive and most valuable.

That focal sepsis may disseminate and cause distant lesions is unquestioned: examples of such lesions are gonorrhoeal arthritis and the osteomyelitis which may follow a simple boil. It is also well established that bacteria from the mouth may be found in the blood stream for a few minutes after dental extraction: the pioneer work of Okell and Elliott on this subject, and the numerous similar studies which followed it, are here fully reviewed. The bacterial endocarditis in susceptible subjects which may follow extraction or be caused by mouth streptococci entering the circulation in some way is a clear example—perhaps the only one—of distant disease resulting from dental sepsis. Apart from this special case, how are we to regard teeth with radiographic appearances said to indicate peri-odontal infection, and what evidence is there that any infection in them may metastasize? It seems that there is a wide divergence of opinion on the interpretation to be placed on these appearances and on the infective nature of the changes they represent. The conclusive evidence must be bacteriological, and unfortunately a tooth extracted in the ordinary way is quite the most contaminated specimen that ever reaches a laboratory. It can be protected to some extent by drying the gum with spirit before extraction, or better by cauterizing it, but however carefully this may be done some salivary bacteria will appear in cultures made from the tooth, and even the elaborate procedure of comparing such a culture with a control made from the saliva itself may fail to decide whether root infection existed. Much of the vast amount of published evidence in this connexion is vitiated by this ever-present possibility of contamination from without, tending to give spurious positive results. It is also possible that spurious negative results may be due to inadequacies in cultural technique. How often, for instance, have anaerobic methods been used, and may not root infections sometimes be caused by anaerobic streptococci or other organisms?

The only way of obtaining material aseptically from the root of a tooth is via the root canal, and those who have done this have usually found that, in a substantial proportion of teeth showing even so definite a lesion as an apical granuloma, cultures are sterile. The nature of this and other root lesions is not yet fully understood, for it is not clear whether they are to be regarded as primarily infective and whether perhaps bacteria originally present in them may die out. In this, which is part of the core of the problem, the conclusions drawn in the American review are cautious. On the whole the tendency is to discount the dangers of such lesions, and equally of impacted teeth or fractured roots. The author is also sceptical of the part played by alleged "toxins" formed in mouth lesions. When he comes to consider the relation of dental foci of infection to disease elsewhere his conclusion, except in relation to

[1] *J. Amer. dent. Ass.*, 1951, **42**, 617.

bacterial endocarditis, is almost invariably that such a relation is unproved. This applies to various forms of arthritis (the therapeutic action of A.C.T.H. is here cited, perhaps too confidently, as evidence that rheumatoid arthritis is not really an infective process at all), to urinary tract infections, to conditions of the eye (" scientific studies to establish dental focal infection as the aetiologic agent in ophthalmic disease is most meagre ") and skin (" the dermatologist falls back on the theory of focal infection when he doesn't know what else to try ").

This review, in fact, ends as an appeal for conservative dentistry (an appeal echoed by a correspondent on another page), and embodies a protest against wholesale extractions for supposed benefits to general health which often fail to materialize. There will be sympathy in all quarters for the appeal to the medical profession to regard the dentist as a consultant and not as a technician ; to obtain his advice on what teeth should be extracted and not merely to instruct him to extract many or all that a patient possesses. We are left in some doubt about how to regard dead teeth exhibiting various kinds of radiographic abnormality. It seems that in most normal people these are harmless enough. The single positive danger which admits of no doubt is that of establishing a bacterial endocarditis in a predisposed subject by neglecting dental sepsis or by performing extractions without taking aseptic precautions in the mouth itself or protecting the patient by chemotherapy. Fortunately it is now widely recognized that a history of rheumatic fever calls for special care when teeth are to be extracted.

THE NEW DENTISTS BILL

Two outstanding changes are proposed in the Dentists Bill, which was introduced by Lord Woolton in the House of Lords on November 27. One is the setting up of a General Dental Council, and the other is the creation, although only in a tentative and experimental way, of a body of ancillary dental workers who, under supervision, may extract or stop teeth. Other provisions in the Bill include a simplification of the procedure for admitting dentists with foreign diplomas to the British *Register* and further restrictions upon the carrying on of the business of dentistry by laymen who employ registered dentists. When the *Dentists Register* was instituted 30 years ago the satisfaction which it gave to dentists was qualified by the fact that the General Medical Council and not the newly created Dental Board had the last word in disciplinary and educational matters. The proposals in the new Bill will give the dentists independence and self-government, as was recommended by the Interdepartmental Committee (known as the Teviot Committee) in its report five years ago. The present Dental Board will be replaced by a General Dental Council equal in size to and closely following the pattern of its medical counterpart, with representatives of each of the eighteen bodies granting dental degrees or licences, and nominees of the State, the G.M.C., and the dental profession.

The Act of 1921 provided for the performance of minor dental work, such as the scaling, cleaning, and polishing of teeth, to be carried out by unregistered persons under proper supervision and in certain restricted circumstances. In accordance with the Teviot Committee's recommendations, a number of " dental hygienists " have been trained to carry out these procedures in welfare and school clinics. Under the new Bill a recognized status will be given to such workers, but in addition the new category of ancillary dental workers will, it is proposed, undertake work hitherto performed by qualified dentists. This proposal derives from the recommendation of the recent mission of five British dentists to New Zealand to study the institution there of what are known as dental nurses, who, after a two-year course of training, are allowed to do not only minor dental work but extraction and filling. The mission brought back a favourable account of this New Zealand scheme, which has been in existence for many years and has resulted in a high standard of technical efficiency and in the meeting of an urgent public need.[1]

The Bill itself does not propose any name for the persons in this new category, but under regulations they will be given a protected title the unauthorized use of which will be subject to penalty. The scheme is at first for an experimental period of three years, at the end of which time an interim report will be made on the results before permanent recognition is accorded. Further, the workers concerned will be employed only in hospitals and public dental clinics. The framers of the Bill have been careful to ensure that there shall be no ground for assuming any recession from the resolutely high standards which the Act of 1921, with its stern barriers against any form of unqualified practice, imposed on British dentistry. Perhaps it is because of these high standards that a departure of this kind, notwithstanding the reputed success of the New Zealand experiment, brings a slight sense of shock. It must be seen, however, in its contemporary context. There are 15,327 dentists on the current *Register* (about one to every 3,500 members of the population), and this total of dentists is lower than that of 1943–5 and only about 1,000 more than it was 25 years ago. The National Health

[1] *New Zealand School Dental Nurses.* Report of U.K. Dental Mission, 1950. H.M.S.O. London; *British Medical Journal*, 1950, **2**, 1162; World Health Organization *Bulletin*, **4**, No. 1, 1951.

Service, and a growing public enthusiasm for dental health, have thrown a vastly greater burden on the profession, and the only way to carry it at present is to call in auxiliary forces.

THE SENSE OF SMELL

The President of the Royal Society, Dr. E. D. Adrian, gave the customary address at the anniversary meeting on November 30, in which, after presenting medals and reporting on the Society's year, he spoke of his own subject as follows:

Sensations of smell are chiefly interesting for their great variety. The olfactory organ is very large, with a sensory surface which in many animals is much greater than that of the eye, and clearly there must be some differences in its reaction to all the different kinds of molecule which have a distinctive smell. It is not difficult to record the nerve impulses which are sent from it into the brain when it is stimulated by smell; they are of the familiar kind with the frequency increasing with intensity of excitation, and from a study of these impulse discharges we might hope to find out how olfactory discrimination is accomplished. It is too early to give a definite decision, but it looks very much as though discrimination depends in the main on differences in the general distribution of excitation over the whole organ, in the spatial and temporal pattern of the activity set up by the arrival of different kinds of molecule. There are slight but distinct differences in the sensitivity of different receptors to different kinds of smell, for when we use threshold concentrations we often find that the impulses are set up in different conducting units; there is no rigid differentiation of the receptors, however, for most of them react to most smells when their concentration is much above the threshold. But the receptors with these slightly different properties are not evenly distributed over the whole organ, and so it comes about that particular smells in weak concentrations have their greatest effect in particular regions. This regional effect turns mainly on the solubility of the stimulating substance in the watery layer which covers the olfactory membrane: at all events substances which are slightly soluble in water have a greater effect in the anterior parts of the organ and those which are soluble only in oil have a greater effect in the posterior parts. There is a similar distinction in the speed of the reaction, for the latency of the discharge is considerably shorter with water-soluble than with oil-soluble molecules. Clearly there must be other factors involved, chemical as well as physical, if the organ is to give a distinctive pattern of excitation for every kind of smell, but its surface is large and there will always be outlying regions which are reached by only a few of the molecules, so that slight differences in sensitivity may well show up in the distribution and timing of the discharge from different parts of it.

Studies of the olfactory organ thus place the emphasis more on the whole pattern of the discharge from it than on the reactions of the individual receptors, though these certainly determine the pattern. But the emphasis ought really to be shifted still further. The olfactory organ is not the only sensitive structure in the nose. The whole of the surface of the elaborate turbinate bones in front is supplied by sensory fibres from the fifth nerve, and many of the substances which we can smell excite these sensory endings as well as those in the olfactory organ. The action of ammonia is a good example. If we sniff a solution in water we are usually aware that the sensation has some localization to the front of the nose. A rabbit turns its head away, as we do, but when we examine the discharge from the olfactory organ in the rabbit we find that it is small or absent altogether. The fact is that in the rabbit, whose anterior turbinate bones are much more elaborate than ours, the ammonia may never reach the olfactory organ at all, for it is filtered away by absorption in the anterior parts of the nose: if absorption there is eliminated by leading the air current directly to the organ through a hole in the roof of the nose, ammonia produces a violent olfactory discharge which has, incidentally, the very short latency we should expect from a substance highly soluble in water.

One cannot, of course, argue freely from the rabbit to man when the structure of the nose is so much more elaborate in the former, but we must certainly take into account the effect of discharges which may be set up in the fifth as well as in the olfactory nerves when we try to explain olfactory discrimination. And when we consider the flavours of food, the nerves of taste and all the sensory endings in the mouth will be involved as well to give the composite pattern which we recognize as that to be expected from, for instance, an anchovy or a banana: and the picture is receiving further elaboration all the time as the result of the movement of air past the fauces and the movements of the tongue and jaws.

It is of some interest to inquire whether this picture is all painted in one part of the brain or whether the different ingredients are sent to different parts of the cerebral cortex and collected together at a later stage. The discharges from the olfactory organ certainly go in the first instance to specialized receiving areas in the ventral parts of the brain, but there is some indication that they are relayed from there to the main sensory receiving area for the nose and mouth on the lateral surface of the cerebral cortex. At all events the complete picture is an elaborate one even when the smell comes from a remote source and not from inside the mouth.

When we compare our own rather simple olfactory judgments with those of an animal which depends as much on its nose as on its eyes, we see even more clearly how behaviour is guided by complex clues from every available source. The remarkable powers of dogs following a trail by scent were investigated by Romanes in 1887, and a recent paper by McCartney gives an excellent account of more recent work. One thing that emerges very clearly is that the dog employs his eyes, his nose, indeed all his powers, in following the trail. Unless he is specially trained he may be guided by vision as much as by scent, and the scent which guides him is that of the crushed earth as well as that of the boots which crushed it.

The sense organs which pick all these clues will not have to wait for the environment to provide them. The environment will be actively scanned by movements of the eyes and ears, by sniffing, turning the head, etc., and the sensitivity of the organs will be actively adjusted to give the best results: the pupils will be made to dilate or contract, and the air entry to the nose will be adjusted by the force of inspiration and the control of the nostrils. All these adjustments will be regulated by the sensory discharges from the organs concerned as well as by the sensory feed-back from the muscles which carry them out. In fact the nervous system will be guided by a picture of the largest possible size, each item of which has been actively focused. The neuro-physiologist has still a great many problems concerning the individual receptor cells, but the interest is shifting to their collective effect. The problem for the future will be to decide how the nervous system can react as it does to such a picture, how it is recognized, and what determines the next step that the organism should take.

INFLUENZA IN GENERAL PRACTICE

Last winter's influenza was notable in several particulars. Only a short time ago we published news of the epidemic from the standpoint of the laboratory workers studying its spread on an international scale.[1] The epidemic was of interest also to the epidemiologist at home, particularly because its onset was characterized by heavy mortality in the North of England, especially in Liverpool.[2] News from the clinical front has, however, been scanty, though Hope Simpson[3] was able to bring out some useful points about attack rates at different ages in a general practice in the West of England. In his experience there was a very high attack rate in affected households, with an explosive pattern of incidence. People of all ages were affected, though relatively more of those aged 20 to 40 escaped clinical illness. Of 69 patients tested, 81% gave a positive complement-fixation test for influenza A, and the World Influenza Centre in London[1] has confirmed the outbreak as being influenza A exclusively.

Elsewhere in this issue (p. 1374) Dr. J. Fry reports clinical details of the outbreak in his practice and analyses the findings in 223 patients seen between the end of December, 1950, and the middle of February, 1951. There were no deaths. Of particular interest was the evidence that the lungs were affected in 37 patients, though in only four were signs of consolidation present. The exact nature of the pathological lesion in the 33 cases with signs in the lung other than those of consolidation is a matter for speculation, but the clinical condition resembled that usually regarded as bronchitis or bronchiolitis, a condition which, as Fry points out, agrees with the experimental pathology of influenza virus infection in mice. Most of those affected by this complication were aged 30 and over, and all except six had a previously clear medical history. The signs were: failure to recover quickly from the initial symptoms; a distressing cough and mucopurulent sputum; inspiratory rales, usually at the bases; and negative radiological findings. Notably, this group of patients failed to improve when treated with antibiotics such as penicillin and chloramphenicol, whereas the four patients with pneumonia responded normally to treatment.

Though there was no direct laboratory evidence in support of this study, there is adequate collateral evidence that the clinical condition described was a true infection by influenza virus A. Infection by strains of this virus, as judged by the clinical signs, does not alter greatly. Dr. Fry's findings closely resembled those found[4] in the epidemic of 1937, yet the virus has changed antigenically since then. It is to be hoped that its biological quality of relative benignity will continue. The particular interest of Dr. Fry's work is that the clinical picture of influenza is appreciated only in general practice, and Dr. Fry has achieved the apparently impossible: finding the time to keep records and to examine patients thoroughly is a monumental task during an influenza epidemic. Those who have written of the scope of research in general practice[5] will be the first to congratulate the author on his achievement.

1 Isaacs, A., and Andrewes, C. H., *British Medical Journal*, 1951, **2**, 921.
2 Semple, A. B., *Proc. roy. Soc. Med.*, 1951, **44**, 794.
3 Ibid., 1951, **44**, 794.
4 Stuart-Harris, C. H., Smith W., and Andrewes, C. H., *Spec. Rep. Ser. med. Res. Coun., Lond.*, No. 228, 1938, H.M.S.O., London.
5 Pickles, W. N., *British Medical Journal*, 1948, **2**, 469.

PREJUDICIAL ACTION

Few medical men are fully aware of the powers invested in the various bodies responsible for taking disciplinary action in the National Health Service. As we pointed out a fortnight ago,[1] "It must be asked whether the procedure provides for justice to be done in theory and in fact." An important case in which part of the procedure may be studied is reported this week in the *Supplement* at page 252. In brief, a general practitioner, Dr. X, practising under the National Health Service in Glasgow, was said to have carried out a scheme to become the successor to the practice of another general practitioner in Glasgow who was retiring from his practice. A considerable number of patients transferred to Dr. X; many had not signed their names on their cards, and Dr. X was said to have filled them in himself or through his receptionist, for whom he was responsible. The Tribunal directed that the doctor's name be removed from all three executive council lists which it was on—namely, Glasgow and the counties of Renfrew and Lanark. The doctor appealed to the Secretary of State, who confirmed that his name should be removed from the Glasgow list but revoked the rest of the Tribunal's direction.

So much for the facts. What may come as a surprise to many doctors is the argument by which the Tribunal reached its conclusion, and it deserves careful study. The Tribunal found that, apart from the doctor's completing the patient's medical cards, there was nothing in his conduct which was illegal or which amounted to a contravention of any of the statutory provisions or of any of the regulations by which the National Health

1 *British Medical Journal*, November 24, p. 1267.

Service is regulated. It was maintained on the doctor's behalf that even the completion of the patients' cards was not a breach of any statutory provision or regulation. The Tribunal could not accept that, but, since it is a practice by no means unknown, the Tribunal stated it would be "unwilling to found a decision adverse to the respondent on this ground alone."

The Tribunal then considered whether the doctor's other actions which were not "illegal" were such that, either taken by themselves or taken along with his completion of the medical cards, they showed clearly that his continuance on the medical list would be prejudicial to the efficiency of the general medical services. The judgment continues as follows: "A tribunal would be slow to hold that actings which are in themselves legal are such as to be prejudicial to the efficiency of the medical services and to justify striking a practitioner off the medical list. It is impossible, however, to legislate by Act of Parliament and regulation against every act by a medical practitioner which may be prejudicial to the medical services, and much must necessarily be left to the good sense, morality, and honesty of practitioners. The matter is one of circumstances and degree, and each case must be considered on its merits and the facts examined as a whole." And the Tribunal concluded that the fact that the doctor's actions were to a large extent lawful was not a complete defence to the complaint made against him.

Everyone is supposed to know what the law is, and to plead ignorance of it will not often be successful in court. That in itself puts a heavy, though inescapable, burden on every citizen, but here we have a man being severely penalized for actions that were largely within the law. The Tribunal looked at the whole story in perspective and saw a scheme by which the doctor succeeded in getting a very large proportion of another doctor's patients to transfer to his list, and its opinion was that his "conduct went far beyond anything which he was entitled to do and was such as seriously to prejudice the medical services." No one would wish to doubt the impartiality of the Tribunal's findings, and in any case part of its decision was upheld on appeal. The lesson clearly pointed by the case is this: that a doctor may be struck off an executive council list for a course of conduct most of which is legal but which may be held "seriously to prejudice the medical services." To the presumption that a doctor knows the law may come to be added a presumption that he knows how administrators think the Health Service should be run. And that would seriously alarm everyone working in the Health Service.

CELL NUCLEUS AND PROTEIN SYNTHESIS

New light on the function of the nucleus in the cell has been thrown in the last ten years or so by the work of T. Caspersson and his collaborators at Stockholm. They have studied the way in which different parts of single cells of different kinds absorb ultraviolet light of certain wavelengths, and compared their measurements with the known power of different proteins and nucleic acid fragments to absorb the same light. This has led them to the view[1] that all protein synthesis needs the presence of nucleic acids, and that the cell nucleus is the main centre of protein synthesis, and therefore of the maturation of blood cells, of secretion in glands, and of abnormal growth in cancer. The use of radioactive isotopes is now making possible the hour-by-hour study of protein synthesis in living tissues, and this alternative approach suggests the synthesis of globin and haemin by reticulocytes (which are without nuclei). A giant unicellular alga has now been shown[2] to grow and regenerate, after excision of its nucleus, for anything from two to five weeks. It is still supposed that nucleic acids are involved, but they must be cytoplasmic and not nuclear.

LONDON'S HEALTH

Sir Allen Daley's annual report[3] contains as usual a mass of information about Londoners in health and sickness and about the services provided by the health department of the London County Council. But this year's report is notable for two reasons: it is the last which Sir Allen will sign before his retirement early next year, and in it he examines the changes which have taken place in the vital statistics of London during the 50 years since 1900. These changes are of course now well known: typical of them is that a baby born in 1950 will on the average live half as long again as a baby born in 1900. Much of this increased expectancy of life is due to the fewer deaths in infancy: the infant mortality rate was 158 per 1,000 live births in 1900, 68 in 1925, and 26 in 1950. There have been similar changes in maternal mortality and in the death rates of the common infectious diseases. Sir Allen points out that these results are not due only to advances in medical knowledge: if the general public is to profit there is need for a continuous process of education about the curative and preventive services which are available, and herein lies one of the most important tasks of all health workers. "It is a depressing thought," Sir Allen writes, "that there was a gap of 30 years between the discovery of the method of immunizing against diphtheria and an intensive campaign to have it used." Of particular interest in this report are the sections on tuberculosis in London during the last half-century and on the care of premature babies. Experience in London has shown that, provided the home and social conditions are fairly good, babies over 4 lb. (2.2 kg.) and not more than six weeks premature can be satisfactorily nursed at home; in nearly all these cases breast-feeding is established without difficulty. The chairman of the London County Council, in a foreword to the report, pays a well-deserved tribute to Sir Allen Daley, who, he writes, "has contributed richly from his wisdom and experience both to the health services of the council and to the public health work of the nation as a whole."

[1] e.g., Caspersson, T. (1947), in *Symposia of the Society for Experimental Biology*, 1, 127.
[2] Brachet, J., and Chantrenne, H., *Nature*, 1951, **168**, 950 (December 1).
[3] *Report of the County Medical Officer of Health and School Medical Officer of the London County Council for the year 1950.*

REFRESHER COURSE FOR GENERAL PRACTITIONERS

PRINCIPLES OF PHYSICAL MEDICINE—II. THE USE OF APPARATUS

BY

WILLIAM TEGNER, F.R.C.P.

Physician in Charge, Department of Physical Medicine, the London Hospital

In physical medicine, as in any other specialty, recent years have been marked by continued advances in knowledge and methods, by rejection of outdated ideas and techniques, and by the adoption of newer and more up-to-date therapeutic measures. Scientific scrutiny has been applied to claims made for the various forms of treatment which previously had been supported on the grounds of empiricism and tradition. The statistical method of analysing the results of treatment has been applied and its necessity has been acknowledged. A stimulus to this progressive improvement and advance in apparatus and technique has been the coincident progress made in other scientific fields, especially that of electrophysics. Thus the adaptation of the thermionic valve to the field of therapeutics has revolutionized nearly all types of medical electrical apparatus. Yet, in spite of this great advance in efficiency and accuracy of apparatus, there has been a marked tendency to concentrate much more on the education of the patient to help himself by means of accurately prescribed and carefully co-ordinated voluntary movements, performed either individually or in groups, than to rely on apparatus to produce effects on a patient who is passive.

Our attitude towards the use of electrical energy itself has undergone notable changes. When it was found that the electrical current could be applied to the human body it was assumed by some, as might be expected, that the panacea had been discovered and that such a current was to play a major part in medical therapeutics. The reverse has now been shown to be the case, and the applied electrical current now plays only a minor and insignificant part in treatment. On the other hand the value of electrical energy in producing other forms of energy, such as heat and certain radiations of the electromagnetic spectrum, has been fully appreciated and exploited. When now the patient speaks in all innocence of electrical treatment it is more probable that electricity is being used to produce some form of heat and is not being directly applied.

Apparatus Used in Exercises

In England the value of free voluntary exercise as a remedial procedure has proved itself and has been generally adopted. In most cases very little apparatus is needed for this, but in certain cases the elimination of gravity is desirable, and this has led to the development of exercises in water, in the form of the deep pool, particularly for the treatment of weak limbs of patients suffering from poliomyelitis and also of many arthritics. But pools are by no means universally accessible; therefore the Guthrie-Smith apparatus, wherein a patient can be partially or completely suspended in slings to avoid the effects of gravity, has been designed by a physiotherapist and has been acknowledged as being most valuable. Again, the best means of obtaining muscular development is to exercise muscle voluntarily against resistance, and this is usually done by some simple device of weights and pulleys, whereby graduated resistance can be applied to the muscle groups which must be strengthened. Similarly, springs can be incorporated in the slings of the Guthrie-Smith suspension apparatus and used to resist the patient's efforts, thus leading to increased muscular strength. It is of interest to note that in America there has been a tendency to produce very elaborate apparatus for what they term "progressive resistance exercises." (Mention must be made of apparatus designed to produce the effects of massage. They are often advertised as being of therapeutic value and as having an effect in reducing weight; neither of these claims can be substantiated.)

Apparatus Used for the Production of Heat

There are numerous ways in which heat can be applied to or produced in the patient's tissues. Some tend to cloak heat treatment in the jargon of mystery and even to ascribe other obscure effects to the physical means employed to produce heat; but it should clearly be understood that such apparatus as radiant heat and infra-red emitters and the various forms of diathermy are used solely to produce heat. Domestic forms of heat applicators should not be neglected—the time-honoured hot-water bottle and kaolin compress are still valuable and effective, as any sufferer knows. Similarly, electric bowl-fires are not to be despised as a source of infra-red irradiation.

Infra-red rays of the electromagnetic spectrum are longer in length than those of the visible spectrum, and the infra-red lamp is usually fitted with a dull or "non-luminous" emitter. On meeting the resistance of the skin the energy of these rays is transformed into heat. These rays do not penetrate further than the skin, and the heat produced is therefore superficial, but is none the less valuable for that. The so-called radiant-heat emitters differ from the infra-red ones in that they also emit a great deal of visible light. Their effect depends entirely on their emission of infra-red rays, but in the case of the radiant-heat lamps there is a greater output of the shorter infra-red rays than from the non-luminous lamps. These shorter infra-red rays are more penetrating and more stimulating to the skin, but it is doubtful if the increased degree of penetration is of any practical importance. Both luminous and non-luminous emitters which are supplied for therapeutic purposes owe much of their superiority over domestic forms of apparatus to the reflectors which are fitted to them and which cause the rays to be evenly distributed over a fixed area.

Diathermy entails the production of heat in the patient's own tissues. In short-wave diathermy, sometimes also known as ultra-short-wave diathermy, the

tissues to be treated are placed in a condenser field and a very rapid oscillation of the electrons in them is obtained by means of thermionic valves in the apparatus. The apparatus generates radio waves of about seven-metre wavelength. This causes the tissues to be treated evenly at all depths; thus a hip-joint or inflammatory focus in the pelvis can be directly heated. In skilled hands, therefore, it is a very valuable method of employing therapeutic heat. In long-wave diathermy an actual alternating current is passed through the tissues. This current changes its phase about a million times in a second. The passage of current takes too short a time to stimulate directly sensory nerves or excitable tissues, but the resistance offered to it leads to the production of heat. This heating is not even but is directly proportional to the resistance offered by the various tissues, and, as such tissues as skin, fat, and bone offer a higher resistance than tissues such as muscle, they are heated to a greater degree. Long-wave diathermy can therefore be a useful means of heating the deep structures of an arthritic joint.

A comparison of short-wave and long-wave diathermy shows that in the former the technique is relatively simple and convenient, as electrodes do not have to be applied in contact with the skin in order to obtain satisfactory deep heat. On the other hand short-wave diathermy apparatus is more costly and has a shorter life than that of long-wave diathermy. There is no doubt that although long-wave diathermy has the disadvantage of needing skilled and exact application of electrodes, which must be bandaged to the part, it does produce a satisfactory deep heat, and some authorities regard it as having definite advantages in certain ophthalmological and arthritic conditions. It is worth noting that in America use is being made of "micro-wave" diathermy or ultra-ultra-short waves; the apparatus generates radio waves measured in centimetres. This produces comparatively superficial heat. This method has not established itself to any extent in England, as it is felt that by correct placing of electrodes both superficial and deep heat can be obtained with the standard short-wave diathermy set.

Dangers.—All forms of heat therapy have the potential danger of causing burns if excessive heat is used. In such forms of superficial heat as infra-red radiations and radiant heat the danger is not great because of the presence of heat-appreciating nerve endings in the skin and because the skin is exposed to view throughout the treatment. In short-wave diathermy heat can be produced deeply in areas where there is no appreciation of heat, and deep burns may be caused if care is not taken; similarly, in long-wave diathermy the skin is usually covered with bandages and the operator cannot watch the skin while treatment is in progress. The potential danger of burns must always be remembered, and it is customary to test skin sensation before treatment is begun.

Paraffin-wax Baths

Paraffin-wax baths are being used more and more frequently as a form of heat therapy for the extremities. This method differs from those already described by being essentially a form of moist heat. Paraffin-wax with a melting point between 115 and 120° F. (46.1 and 48.9° C.) is melted and applied either by dipping the part into the wax or by painting it on with a brush. The wax is left on for twenty minutes to half an hour. The heat of the wax causes a vasodilatation and hyperaemia with sweating. But the superimposed wax prevents the sweat from evaporating, and heat is not lost, thus more sweat is secreted and the skin becomes moist and pliable. After removal of the wax it is customary to exercise the affected part actively. The potential danger of paraffin-wax baths is that the paraffin may catch fire; precautions have to be taken against this.

Muscle Stimulation

Muscle can be artificially stimulated to contract by electrical excitation. But no such statement should be allowed to pass unqualified without making it perfectly clear that the best way to ensure healthily contracting muscle is by active voluntary exercise, either with or without resistance, rather than by passive stimulation by an electrical current. The traditional currents used in muscle stimulation are the faradic and the interrupted galvanic or constant. The faradic current is easily generated from small cells in the apparatus commonly known as the Smart-Bristow coil; it can also be obtained from a switchboard by modification of the mains current. In more modern apparatus it is obtained by modification of the mains current by means of thermionic valves. This current is essentially a low-frequency alternating current of low voltage, one phase of which stimulates the muscle to contract through its motor nerve. Thus an intact motor nerve is essential. It is usually applied in the "surged" form, in which the intensity is raised from zero and a tetanic contraction is excited and relaxed. Its main use is to re-educate muscles that are too weak for the patient usefully to contract, or, as in the case of the intrinsic muscles of the foot, when the patient has forgotten how to use them. It should always be used in conjunction with voluntary contraction.

An interrupted direct current will stimulate muscle directly without the necessity for the presence of an intact nerve supply. It is therefore used in maintaining the contractibility of muscle which has temporarily lost its nerve supply, as in injury to motor nerves. It is this differentiation between the response to the faradic and interrupted galvanic currents that governs the traditional test for the muscle whose nerve supply has degenerated, leading to the reaction of degeneration.

The modern apparatus for muscle stimulation employs thermionic valves to produce electrical impulses, the duration, frequency, and intensity of which can all be varied. Such "balanced pulse" stimulators can be used for treatment but are also of great diagnostic value, as a day-to-day record can be kept of the response of affected muscle to stimuli of varying length, strength, and frequency.

The Direct Current

This is also known as the constant and the galvanic current. Like the faradic and sinusoidal currents (see below) it can be obtained from a combined switchboard, in which the mains current is stepped down and suitably modified to produce a constant current which can be passed through the tissues; it can also be obtained from a battery. The effect of passing such a current of low amperage through the tissues is to cause a dissociation of the ions of the tissue salt solutions with a deposition of acid and alkali under the electrodes. It is claimed to cause hyperaemia and counter-irritation: the cathode is said to be stimulating and the anode soothing. Such a current is also claimed to be of value in reducing

oedema. But it is important to realize that these claims are not generally acknowledged by the medical profession as a whole, and that such treatment is prescribed only by a small proportion of practising doctors. An inherent danger in the use of the direct current lies in destruction of the superficial tissue by the deposition of acid and alkali under the electrodes, the so-called "galvanic burn." Thus pads have to be used beneath the electrodes to prevent this, and great care has to be taken to ensure correct technique.

The direct current can be used to introduce substances into the tissues by the process of ion transfer or ionization. A great number of substances can be introduced in this way and there once was a vogue for the introduction of such "antirheumatic" drugs as the salicylates and potassium iodide by these means. This form of treatment is losing popularity, and the main substances now introduced by ionization are histamine and drugs with similar properties, which cause local vasodilatation. General reactions may occur after the introduction of histamine and great care has to be taken in treatment.

The caustic effects found at the electrodes when the direct current is used are sometimes employed for the destruction of small naevi. A needle electrode is a satisfactory method of removing unwanted hair.

Sinusoidal Current

The sinusoidal current is a low-frequency alternating current, but it differs from the faradic in stimulating at both its phases. It is often applied by means of baths, and as, like the faradic current, it produces a tetanic contraction of muscle it is usually surged. It is claimed that sinusoidal baths assist in stimulating peripheral circulation by causing a pumping action of muscles and by causing vasodilatation of the skin. This current is losing popularity and is not often prescribed.

Ultra-violet Radiations

These rays of the electromagnetic spectrum are shorter than those of the visible spectrum. They are most commonly produced by arcing a current across carbon electrodes, in which case the open flame of the carbon arc emits an intense heat and light in addition to some ultra-violet rays, or by the passage of a current through ionized mercury in a quartz tube, the so-called mercury-vapour lamp. Ultra-violet rays have many physical, chemical, and physiological properties.

The carbon-arc and the mercury-vapour lamp can be used for general irradiation, in which case the longer ultra-violet rays play the greater part. These cause a delayed erythema of the skin, which is followed, after repeated exposure, by tanning due to the deposition of melanin. An overdose can cause a severe "sunburn." The claims for the value of general ultra-violet irradiation seem exaggerated. There is no scientific evidence that they prevent infection and reduce susceptibility to colds. Small amounts of vitamin D are certainly produced in the skin under their influence, but the treatment of vitamin-D deficiency is to give this by mouth, not indirectly through ultra-violet irradiation. There is no doubt, however, that general ultra-violet irradiation has a traditional reputation for having tonic properties, and it remains popular probably for its psychological effects.

Local application of ultra-violet irradiations is usually carried out by means of a mercury-vapour burner which is water-cooled. Use is made of the shorter and more destructive wavelengths, and so powerful are these rays that considerable superficial destruction of the skin can be achieved by application of the burner for a matter of a few seconds. This can produce a powerful counter-irritation as well as destroy and sterilize the surface of such lesions as indolent ulcers. The local application of ultra-violet irradiations is specific in the treatment of lupus vulgaris, and when it was evolved by Finsen it revolutionized the treatment of this condition. The situation has been somewhat modified recently by the use of calciferol. Local ultra-violet irradiation is of value in a large group of dermatological conditions.

Obsolescent Apparatus

In the process of medical evolution once-popular remedies frequently lose their popularity and become forgotten. Thus in physiotherapy departments one may still see high-frequency effluve machines by which the skin was once electrically stimulated; similarly static machines may be preserved as museum pieces which show how in the old days patients were suitably impressed by being treated with static shocks. Unreasoning support of discredited remedies has no place in modern medicine, and these pieces of apparatus are best forgotten.

New Treatments

New forms of apparatus are being evolved and await trial before their value can be assessed. One of these—the micro-wave diathermy machine—has already been mentioned. Recently much literature has appeared on the use of ultrasonics as a therapeutic agency. Sound waves beyond the frequencies which stimulate the human ear can be produced by the phenomenon of piezo electricity. Claims have been made that these are of value in a truly surprising range of conditions. This enthusiasm for a possible new remedy is a familiar phenomenon, but at the time of writing the value of ultrasonics remains unproved.

Addressing the Reading Pathological Society, Sir Robert Hutchison recalled the hospital atmosphere of 50 years ago (see the *London Hospital Gazette*, October, 1951). The thing that would most strike modern doctors if they were able to visit a hospital run as it was then would be the simplicity of the methods of diagnosis. The history would first be read out by the clerk—"often not a very literary production. (When I see correspondence in the *B.M.J.* complaining of the illiteracy of the present-day student I remember how much of my time was spent in correcting spelling and grammar 50 years ago. Students were always illiterate—but so were many members of the staff.)" Then the patient would be examined, and the clerk would give the results of some elementary tests—presence or absence of sugar or albumin in the urine, for instance—and that was about all: no reports, because there was no material for them; *x* rays had only just begun and were used only for fractures and simple surgical injuries; barium meals did not exist; and "there were no biochemical reports (happily!), because there were no biochemists." In 1900 it cost about £115,000 a year to run the London Hospital, and 50 years later it cost about £1,200,000. Sir Robert added that he did not believe that the hospital was now doing 10 times more good to the community; inflation brought about by two world wars was partly responsible, but the main reason was the present inflated staffs—both lay and medical. To-day the average stay of a patient in the London is 18 days; in the early part of the century it was only 13.

SIR WILLIAM GOWERS AT THE NATIONAL HOSPITAL

BY

Sir GORDON HOLMES, C.M.G., M.D., F.R.C.P., F.R.S.

The Gowers Library at the National Hospital, Queen Square, was opened by Sir Gordon Holmes on November 29, in memory of Sir William Gowers. The money for this comes from bequests by Sir William's two daughters. A note on the ceremony appears elsewhere.

Just over 80 years ago a recently qualified physician was appointed the first medical registrar or "assistant to the physicians" to the National Hospital, which, though established only ten years earlier, was already an active and prosperous institution and included in its staff several of the best-known physicians of the day. This young physician was William Gowers, who later became one of the most eminent officers of the hospital, which he served energetically and devotedly for the following 40 years, during which he inscribed his name in the roll of the most distinguished physicians of his generation.

An adequate appreciation of Gowers's services to medicine requires a short review of his professional career. This has been recently dealt with by Dr. Macdonald Critchley in his biography of Gowers, to which I am indebted for many details. Owing to the death of his father while he was still a boy his formal education was restricted, but at the age of 15 he was, as was frequently the custom at the time, apprenticed to a doctor practising in Essex, where some of his relatives had lived. Here he spent hours when he was not engaged in his routine duties in the study of Latin and German as well as chemistry and botany, in the latter of which he became particularly interested and proficient. And his diary records that in addition to reading in the unoccupied moments of his day he rose from bed in the early hours of the morning and devoted two or three hours to the study of subjects that interested him, including those necessary for matriculation in the University of London, which he obtained with honours at the age of 18. And now, too, he perfected himself in shorthand, which proved such a valuable asset to him in his later life.

At the end of his two years' apprenticeship the problem of a sufficient income to enable him to join a medical school became urgent, but luckily fortune, that so frequently favours the deserving, came to his help. Nearly 50 years ago I spent a week-end with a friend whose father was vicar of Coggeshall, where Gowers had served his apprenticeship. The vicar, then an old man, asked me if I had met Willie Gowers, and told me he never knew a more intelligent, industrious, or conscientious boy. He became so interested in him that when his apprenticeship ended he brought him to London and introduced him to his friend, Sir William Jenner, then one of the physicians to University College Hospital and President of the Royal College of Physicians, who promised his help and advice. Jenner appears in fact to have used him during his undergraduate career as a secretary and assistant, and by the meagre salary he paid him enabled him to live in moderate comfort. This association continued even after Gowers qualified in medicine at the age of 22.

Gowers at U.C.H.

Subsequently Gowers gained almost all the post-graduate honours at the disposal of the University and was appointed physician to University College Hospital and assistant to the professor of medicine. While he held these appointments he published several original contributions to medical knowledge, including a description of the anatomy of the nervous system and articles on diseases of the heart, of the blood, and of other organs. His ingenuity was revealed in a useful modification of the type of hypodermic syringe then in use, and in the invention of methods of enumerating the red and white cells of the blood and estimating the percentage of haemoglobin it contains. These methods were almost universally employed, in England at least, till recent years.

In 1888, however, at the age of 43, when he had apparently reached the acme of his career as a general physician, with the prospect before him of a large and lucrative practice in medicine, he suddenly retired from his appointments at University College Hospital and devoted the rest of his working life to the study and teaching of neurology at the National Hospital. This had been founded only ten years previously in an old and poorly adapted house with at first accommodation for only eight patients. Owing to the progressive policy of its board of management, or more accurately of Miss Johanna Chandler, to whom its foundation was really due and who provided the initiative and a considerable proportion of its annual income, adjoining houses were later purchased, so that when Gowers joined its staff it contained about 60 beds. Many of these were still in the original houses, though plans for erecting in their place a modern hospital were already in being. The out-patient departments had developed even more rapidly, as they offered special services nowhere else available in London or even in Europe. In the year 1870, for instance, over 2,000 individual patients made 12,000 visits to them.

Early Days at the National Hospital

Gowers's interest in diseases of the nervous system was probably due to the fact that some of his teachers and colleagues at University College Hospital, including Russell Reynolds and Charlton Bastian, were already physicians to the National Hospital. It was possibly on their advice that the post of registrar or "assistant to the physicians," to which he was appointed in 1870, was created for him. This post, which he held for the succeeding four years, must have offered him exceptional opportunities of gaining knowledge and acquiring experience, for his duties required that he should work in close association with all the senior physicians. When a few years later a vacancy occurred on the honorary staff he was elected assistant physician with charge of out-patients, but his further promotion was exceptionally slow: it was not until 20 years later that he became a full or senior physician to the hospital with charge of patients in the wards.

Fortunately, while assistant physician he worked as junior colleague to Hughlings Jackson, whom in subsequent years he frequently referred to as "my master."

This was an ideal combination, for while Jackson was pre-eminently a physiologist and a philosopher who found material which interested him in but few of the patients under his care, every patient presented to Gowers problems and experience in the diagnosis and treatment of disease. In order to afford him further experience Jackson handed over to him the care of some of his patients, but to this the board of management objected, pointing out that though a physician may occasionally transfer a patient to the care of his junior he must remain responsible for his treatment. It was only some years later that Gowers obtained the right to retain in the wards under his own care a few patients who, in his opinion, needed special investigations or continuous observation.

For 20 years, however, his duty consisted in interviewing and treating patients week by week in a small and ill-equipped room which contained neither the apparatus nor the equipment considered necessary to-day, and was frequently shared by a colleague. Here, with his characteristic energy and thoroughness, he investigated the patients allotted to him, and when they presented symptoms that threw light on the nature or localization of disease recorded these in shorthand for future study or reference. Thus he collected an enormous body of facts and observations which served him well in writing his celebrated *Manual* and other publications.

Teaching at the National Hospital

It appears that for several years he had little or no opportunities of teaching or demonstrating patients to either graduate or undergraduate students, though while still on the staff of University College Hospital he occasionally brought some of his students from there to enable them to see rare or interesting nervous disorders. Even when more accommodation became available in the out-patient department it was apparently not officially open to students till later years. Several years ago an aged doctor who came under my care told me that on casually entering the out-patient room one day Gowers, whom he found alone, invited him to sit down and discussed with him the significance of the symptoms which he found in his patients. My old friend accepted his invitation to return and bring with him some of his friends. This was apparently the start of teaching in the out-patient department which later became a prominent feature of the medical school.

Though not connected with the University of London or with any recognized school of medicine, considerable importance was attached to teaching from the earliest days of the hospital—in fact Brown-Séquard, one of the two original physicians, delivered lectures on the physiology and pathology of the nervous system even before it was officially open to patients. There is, however, no record of organized teaching after Brown-Séquard returned to Paris four years later, or for the next 15 years or so, and thereafter efforts to establish regular courses of lectures were made only by individual members of the staff till about 1890. It is a curious fact that the board of management repeatedly urged on the staff that "the delivery of lectures is an important and obvious duty and one contemplated by the rules of the hospital," but for several years the physicians were reluctant to undertake it.

Gowers, in fact, seems to have been one of the first to initiate regular courses of clinical teaching. While still only an assistant physician to out-patients he arranged, apparently on his own responsibility, to deliver one lecture a week in the old operating room, which also served as a clinical theatre. To these he quickly attracted such numbers of students and postgraduates that he had to invoke the assistance of his junior colleague, Charles Beevor. Though there are few records of these personal and unofficial efforts to provide instruction in neurology, they probably continued till a properly organized medical school, with Beevor as its first dean, was established in 1896.

When after 20 years' service in the out-patient department Gowers was appointed an extra physician with charge of patients in the wards he devoted less time to teaching on individual cases unless they presented problems that particularly interested him. He was, however, usually pleased to entertain visitors whom his fame brought to the hospital and the two or three postgraduate students who were generally attached to him. Then his interest was more centred on formal lectures, of which he generally gave two or three each term. Many of these, written in his simple but elegant prose, contained new observations or conclusions and, when extended and elaborated, were later published in medical journals or in separate monographs. And, in addition to these, in each of several years 8 to 10 contributions, some critical, some creative, appeared from his pen. These were never merely the fruit of an urge to write, but of a desire to present his considered views or to clarify problems raised by others. Many were of ephemeral interest only, but some contained observations or appraisements of permanent worth.

Gowers as a Neurologist

Those who had the good fortune to work with or under Gowers were particularly impressed by his encyclopaedic knowledge and by the skill with which he applied it at the bedside. He approached each case as a separate problem on the solution of which appropriate and efficient treatment depended. His eminence as a clinical teacher, on the other hand, was due to his skill and thoroughness in eliciting signs of disease and in presenting them to his audience in such a manner as to make the diagnosis (that is, recognition of the nature and site of the morbid processes to which the patient's symptoms were due) evident to all who were present. He was pre-eminently an accurate and precise observer, never satisfied with a conclusion unless it embraced all the relevant facts, while his teaching was distinguished by a clear and logical presentation of all the evidence revealed by his investigations. For years it was a matter of surprise to his house-physicians and assistants if a diagnosis he had made was not confirmed by further developments of the case or by post-mortem examination. And in those days *x* rays, examination of the cerebrospinal fluid obtained by lumbar puncture, various electrical devices, and other accessory aids to diagnosis were not available to the physician.

There is little doubt that the history of neurology will allot to Gowers a prominent place in the small group of physicians—including his contemporaries Charcot and Pierre Marie in France and Erb in Germany, as well as some of his colleagues at Queen Square—who established it as a scientific branch of medicine. He may not have identified as many diseases as separate morbid entities as Charcot and others, but anyone familiar with the medical literature of his day must be impressed by

his certainty in interpreting the nature and significance of pathological deviations from the normal and by the clarity and completeness of his descriptions of them.

But even now, and certainly in the future, Gowers's name and fame will be chiefly associated with his celebrated textbook *Manual of Diseases of the Nervous System*, the first volume of which appeared in 1886. Here its English readers found for the first time a review as complete as was then possible of nervous disorders, presented in that faultless style that distinguished all his writings, and illustrated mainly by his own drawings and etchings. But the main, and possibly the most valuable, feature of the *Manual* was that it represented the personal views and experiences of an extremely acute observer, and consequently remains even to-day a living classic of clinical medicine which includes in its pages facts and interpretation of facts that were only slowly, and often much later, generally recognized and absorbed into the body of medical knowledge. A second edition of the complete *Manual* appeared a few years later. Unfortunately, only the first volume of the third edition, which was revised with the help of his friend and colleague, James Taylor, was published in 1889.

Though in subsequent years many important papers appeared from his pen, the *Manual* remains his chief monument, but to those who knew him and worked with him he was obviously greater than his monument. To him the National Hospital is largely indebted for the high level of its clinical practice; few have added so much to its reputation as a centre of scientific medicine or contributed more to its policy as a teaching school.

REPORT OF THE MINISTRY OF HEALTH

APRIL, 1949, TO MARCH, 1950

In addition to a review of the first full year's working of the National Health Service, the Report (Part I) of the Ministry of Health for the year ended March 31, 1950,* deals with housing, local government, civil defence, welfare services, water, and sewerage. The parts of the report dealing with hospital and specialist services and the general medical services are noticed in the *Supplement* at p. 253.

Maternity and Child Welfare

The report admits that much criticism has been levelled at the division of the maternity services into three different sections for administrative purposes, but points out how difficult it would have been to organize the maternity service apart from the other health services provided under the Act. "The maternity medical service was meant to be not a substitute for, but an addition to, the facilities already available for the care of expectant and nursing mothers; that in domiciliary midwifery, the midwife should continue to be regarded as the normal attendant, but now had at hand to assist if need be a doctor who already knew the case; and that general practitioners, midwives, and the staffs of clinics and hospitals all had their parts to play as members of a team."

To meet the demand for analgesia in childbirth, during 1949 local authorities provided 5,454 sets of analgesic apparatus, and gas and air was given by midwives to over 128,000 mothers confined in their own homes; this compares with 40,000 mothers receiving the same analgesia in the preceding six months.

In 1949, for the first time, the maternal mortality rate fell below 1.0, being 0.97 per thousand total births, compared with 1.02 in 1948. The infant mortality rate continued to decline, being 32.4 per thousand live births, although the rate for illegitimate births was 44.8; illegitimate births were 5.1% of all births. The report stresses the importance of keeping the unmarried mother and her child together, wherever this is possible.

Concern is expressed that mothers do not take their children more regularly to child welfare centres after their first birthday. Of the 2,992,000 children between 1 and 5 years only 27% were attending, with a yearly average of only four attendances per child.

Mental Health

On January 1, 1949, there were 56,790 males and 75,800 females in Health Service mental hospitals. Three factors are said to have contributed to the serious overcrowding of these hospitals, which by the end of 1949 amounted to 14%. First, there were still 2,753 mental hospital beds diverted to other services; secondly, only 92 new beds were provided by regional hospital boards for patients under the Lunacy and Mental Treatment Acts; and, thirdly, 2,279 beds were not in use owing to shortage of staff. "Additional beds are not being provided in sufficient number to keep pace with the increase in the demand, which results not from any increase in the incidence of mental illness, but from a normal growth of the population of the country."

Of the 108,222 known mental defectives under statutory care on January 1, 1950, 56,506 were in institutions. Accommodation was still insufficient, however; the waiting-list for urgent cases numbered over 5,000. Here again shortage of nurses was an important limiting factor; no fewer than 2,245 beds were unoccupied for that reason.

The Nursing Shortage

In an appendix to the report the numbers are given of nursing and midwifery staff (including student nurses and pupil midwives) in all civilian hospitals in England and Wales on March 31, 1950. There was a total of 125,131 full-time nurses (23,624 part-time) and 8,888 full-time midwives (969 part-time). Of these, 20,219 full-time and 5,842 part-time nurses were employed in mental hospitals, and a further 6,083 full-time and 1,919 part-time nurses in mental deficiency institutions. This compares with 68,762 nurses engaged full-time in general hospitals, and 8,967 part-time. It is estimated that 17,668 additional full-time nurses were needed for the general hospitals, 8,407 for mental hospitals, and 2,730 for mental deficiency institutions.

* *Cmd.* No. 8342, H.M.S.O.

DRUNK IN CHARGE

What was stated to be the first public conference in this country to discuss the problem of alcohol and the road user was held in London under the auspices of the Pedestrians' Association on November 24.

Dr. A. L. GOODHART, K.C., Master of University College, Oxford, who presided, said that this was a major social problem. They all welcomed the downright statement of the Lord Chief Justice that the drunken driver was as dangerous as a mad dog. But it was not the drunken driver who was their main concern; it was the man who was "quarter-seas over" without realizing it who caused the most accidents. He quoted the finding of the Medical Research Council that "under the influence of alcohol accuracy and avoidance of accidents are jeopardized." The Scandinavian countries and Holland were taking resolute steps to meet the danger. What nonsense was the statement, "A little drink improves my driving." The British Overseas Airways Corporation allowed no one connected with the flying of a plane to take an alcoholic drink for eight hours before the flight or at any time during the flight. The driver who had taken enough to drink to give him false confidence on the one hand and to impair his ability to drive on the other was just as much a menace on the roads as was the drunken driver.

A Police View

The first contribution to the discussion was made by the police. Captain A. POPKESS, Chief Constable of Nottingham, said that many motorists charged before the Courts escaped their just deserts because they were examined by a doctor an appreciable time after the accident and so were able to comply reasonably well with the medical tests. The "devil-may-care" state of mind induced by alcohol, if the blood had not been too heavily saturated, might rapidly diminish as a result of the shock of an accident and intervention by the police. The menace of the drunken driver had now assumed such formidable proportions in this country that any scientific test promising to be useful in dealing with him should be tried. A graph of the hours during which street accidents occurred in Nottingham showed clearly enough that between 10 and 11 p.m., when the public-houses were closing, the accident rate was at its highest. During that hour it was about twice as high as it was between 8 and 10 a.m.

Make the Punishment Fit the Crime

Dr. J. ARTHUR GORSKY, Vice-president of the Police Surgeons Association of Great Britain and Ireland and Deputy Coroner for Middlesex and for East London, said that the problem had lately become more acute because of two legal factors—namely, that the punishment did not fit the crime, and that the criminal law relating to the alcoholic driver was static. While medicine had advanced its knowledge of the effects of alcohol on driving, research had made more informative certain clinical signs, and the work of observers in different countries had indicated clearly the value of the blood and urine alcohol tests, yet these tests had not been made compulsory in this country as they had in Scandinavian countries and in some American States. He was assured by the Traffic Commissioner in Copenhagen that the accident rate due to alcoholic drivers had fallen to 2% from 10% since the blood alcohol test had been made compulsory.

In discussing the reasons for the many acquittals in cases of "driving under the influence;" Dr. Gorsky said that although the word "drunk" had been dropped when the Road Traffic Act, 1930 (Sect. 15), was substituted for the provision in the Criminal Justice Act, 1925, magistrates and juries still assessed these cases as if the word "drunk" was operative. They were not primarily interested in the fact that the accused had been drinking; they wished to be assured that he had consumed an obviously excessive amount of alcohol. They did not appreciate the danger of the sub-intoxicated driver. Dr. Gorsky pleaded that with the appalling slaughter on the roads the widened duty to take care, expressed in the Law of Torts, should be embodied in the strict criminal law; and that the penalties and sanctions against the motorist who by reason of alcohol failed to ensure that his neighbour escaped injury should be increased. In France if a driver was found guilty of a driving offence the Prefect was bound by law either to suspend his licence for a period not exceeding three years or to withdraw it altogether, and this last penalty was compulsory in all cases of drunkenness in charge.

Menace of Faulty Vision

Alcohol was rapidly absorbed unchanged from the stomach and small intestine, especially if the stomach was empty and the alcohol fairly concentrated. In a state of moderate intoxication the blood concentration was 150 mg. of alcohol per 100 ml. of blood. This concentration of 0.15% was equivalent to 7 or 8 ounces (200 or 230 ml.) of whisky or 4 pints (2.27 litres) of beer on an empty stomach. The effect of taking the equivalent of only 3 ounces (85 ml.) of whisky had been shown to diminish attention and control, to reduce capacity to learn, and to affect reasoning powers adversely. Quite small amounts of alcohol usually reduced the rapidity and accuracy of neuromuscular co-ordination. The driving of a car involved a succession of highly skilled muscular movements dependent on rapid and accurate co-ordination of eyes, hands, and feet, and insufficient attention had been paid to the relationship between faulty vision and road accidents. How much more dangerous were drivers with unsuspected visual defects when they had taken a little alcohol. It had been suggested that small doses of alcohol might diminish peripheral vision and induce the phenomenon known as "channel driving"—that is, an inability to notice things approaching from the side.

Dr. Gorsky concluded his forceful address by quoting from a leader from this *Journal* of October 18, 1947:

> "No single measure will eliminate road accidents, and if their numbers are to be diminished at all we must submit to more restrictions of our personal liberty, whether drivers or pedestrians. A few may ask, Is it worth it? The nation must make the decision, and it can do so only if it is presented with the facts: on the one side the loss of more life; on the other the loss of more freedom."

Medical Evidence Overrated

Dr. J. A. IMRIE, Chief Medical Officer, Glasgow Police, said that the medical man came into this picture at a relatively late point. His opinion could be based only on the man's condition at the time of examination, and his importance as a witness had in some respects been over-emphasized. Medical opinion was apt to be regarded as of so great importance that the issue of the case frequently turned upon it, and should it be contrary to police opinion there was a probability that no proceedings would be taken. He considered this to be rather a serious state of affairs. Primarily the medical man's office was to determine whether the individual was incoordinated and, if so, whether this was due to alcohol or to some other pathological condition. For the past ten years in Glasgow it had been the practice to examine the urine for its alcohol content, and this had proved most useful as a corroborative test, because it could be translated into the ordinary terms of quantity of alcohol taken.

Four criteria were useful: the appearance and behaviour of the motorist at the time of apprehension; the opinion of an experienced police officer; and medical opinion on co-ordination and on whether there was any other pathological condition which might explain the behaviour in whole or in part. The opinion on whether a man could drive a car should be left to the bench, the medical officer dealing only with the presence of intoxication and of alcohol in the blood or urine and giving his estimate of the probable amount of alcohol drunk. That would be fair both to the prosecution and to the accused.

Plea in Mitigation

Dr. HENRY YELLOWLEES said that psychiatry had very little to say on this problem. The psychiatric witness was regarded with suspicion and even derision in court in cases of this kind. In offences due to alcohol, as in cases of shop-lifting or sexual abnormality, the underlying psychological mechanism was very important and always offered an explanation, but that explanation was very rarely an excuse in law, though evidence of abnormality often formed a powerful mitigating plea. He himself never gave evidence in these cases unless the plea was "guilty," and then he had something to say in mitigation. In cases of "drunk in charge" a psychiatric defence was quite irrelevant and nearly always hopeless, because the law quite naturally regarded getting drunk as a conscious voluntary act, totally different from actions committed during, for example, a hysterical fugue.

He agreed about the necessity for scientific tests being made compulsory, because such signs as the smell of the breath or inability to walk along a chalked line or to repeat certain words rested on opinion, and also because of the time factor.

After some questions and general discussion, a summing-up of the lessons of the Conference was given by Mr. R. GRAHAM PAGE, Chairman of the Pedestrians' Association.

Correspondence

Hip Reconstruction by Acrylic Prosthesis

SIR,—The replacement of the femoral head by a plastic mould as described by Drs. Jean and Robert Judet, of Paris, is fast becoming in this country a popular operation for various conditions of the hip-joint. Yet I was surprised to hear a very distinguished British surgeon tell me that the Judet operation was simple and would soon replace radiologically controlled pinning by the Smith-Petersen triflanged nail for median fractures of the femoral neck. I was surprised, too, to learn that many young surgeons now accept the view of my distinguished colleague. Surely the Judet operation is still *sub judice*, pending further trial and time for the evaluation of its proper place in the surgery of the hip?

I remember the early days of the triflanged nail fixation for femoral neck fractures, when we considered it the complete answer to a formerly unsolved surgical problem. After nearly 20 years we now know it is only a partial answer, yet in skilled hands the operation can give better than 60% excellent results, and in the average surgeon's hands something like 50%. This is a great advance and should not readily be put aside for an untried operation. It would seem more reasonable to await the failure of the nailing operation before using this new method.

Even now it is a little difficult to understand the surgical principles upon which the acrylic prosthesis operation is founded. Smith-Petersen took the view, and has proved it, that his mould arthroplasty is first of all a precision operation, and therefore technically difficult. Secondly, that his vitallium mould should move smoothly in the acetabulum *and* over the re-formed femoral head, and by this movement the formation of good weight-bearing cartilage over both of these surfaces would take place. He insists that this is *the* surgical principle upon which all mould arthroplasties, where foreign material is used, are based.

In a recent personal revision operation of an acrylic head I was interested to note that there was a small but appreciable movement of the acrylic prosthesis on the *femoral neck*, that the movement was only in one direction—i.e., rotatory round the long axis of the neck—otherwise the prosthesis sat very firmly on the stump of the femoral neck. On removal of this prosthesis, I saw what appeared to be good firm cartilage covering the end and the sides of the femoral neck, in fact all the surfaces over which the prosthesis fitted. This case would seem to indicate that the Judet prosthesis follows the mould arthroplasty principle proved by Smith-Petersen, and the success of the Judet operation does not depend upon "forming a solid joint that will not easily be disturbed" between the femoral neck and the acrylic head.

On examining the radiographs of successful operations performed one to two years previously by Professor Merle D'Aubigné in Paris, I was struck by the fact that the femoral necks had not decreased in size following a long period of weight-bearing, but at their junction with the acrylic head they showed a thin line of sclerosed bone typical of the pseudarthrosis seen in ununited fractures, further evidence that may indicate that the movement of the prosthesis on the neck is an important factor in the success of the Judet operation. Nor would this be surprising. Before Smith-Petersen gave us his triflanged nail various shapes of immobilizing material were tried in an endeavour to hold firmly the femoral head on the neck, yet in spite of using many shapes the head rotated transversely round the longitudinal axis of the femoral neck and non-union of the fracture almost always resulted.

The purpose of this letter is twofold. First, an earnest plea for the retention of the triflanged nail as the first treatment of median fractures of the femoral neck. Next, to stimulate a clinical inquiry into the surgical principles upon which the Judet operation is founded. This letter contains but a suggestion of surgical principle, but it is intended to indicate that the Judet operation must always be in the realm of precision surgery and can never be a simple procedure.

Years ago Mr. Eric Lloyd stated that "the bad results of nailing were the results of bad nailing." What appears now to be a further contribution to the surgery of hip fractures may well suffer the same fate if sufficient attention to precision and detail is not now insisted upon.—I am, etc.,

Birmingham Accident Hospital. WILLIAM GISSANE.

SIR,—We were very pleased to read Mr. William Gissane's letter, and we agree with many of his points, especially when he says that our operation is still *sub judice*. Nobody has said this more strenuously than we have done many times, both because it is true and because we want to avoid an excess of enthusiasm, always dangerous for the future of a new method. About the special point of neck fracture, we have a slightly different idea of the indications for acrylic prosthesis. In most cases we treat the fracture by the classic means, and specially by Johanson's screw associated with a bone graft. But we think that some cases—very old people, porosis of the head, sub-capital fracture—are good indications for putting an acrylic head. That is to say, we use an acrylic head in all the cases where we have good reasons to fear a non-union of the fracture, or when the life of the patient seems to be threatened.

But we do not agree with the other part of Mr. Gissane's letter concerning "the surgical principles upon which the acrylic prosthesis is founded." First, we know, from several revision operations, that in most cases the head does not move at all on the stump of the neck, and specially the movement which Mr. Gissane has seen—i.e., rotation round the stem—has never been seen with our model of head with threaded stem. In one of our old cases, with a polished stem, we have seen this rotation; it was a poor result. We think that all movement of the acrylic piece on the bone is bad. It is well known, from Robineau's work, that motion of a prosthesis is the beginning of porosis around it, and so on, by a *circulus viciosus*. And this is quite in line with our observations.

As for the line of sclerosis that Mr. Gissane has seen on the d'Aubigné radiographs, it may be seen in all the old cases of acrylic head. But it may be seen also at the end of any bone cut by an amputation. We think that it does not prove any motion of the bone against the acrylic piece, but only the healing of the wound of the bone.

Finally, we agree to the principle that our operation "must always be in the realm of precision surgery."—I am, etc.,

Paris. ROBERT JUDET.

Blood Tests for Bornholm Disease

SIR,—Although the difficulties that must often exist in making a specific clinical diagnosis of infections which may be caused by the Coxsackie group of viruses are appreciated, we feel that in replying to the request of Dr. F. E. James for laboratory aid (November 17, p. 1218) some of the problems involved should be pointed out.

This group of viruses forms a collection of agents whose common factor is pathogenicity for newborn but not adult mice or hamsters. The isolation of one of these viruses does not mean that it must have been the cause of illness. Under certain circumstances symptomless carriers may exist, and there have been reports of the isolation of two distinct strains from one person within a short period of time. A diagnosis depends on the development of neutralizing or complement-fixing antibody during the course of illness. At least 13, and probably more, immunologically distinct strains of virus are known to exist. Each serum would therefore have to be tested against this number of antigens to make a diagnosis. Adult sera may contain antibody against several strains of virus from past infection, and while it has been found that following a particular illness antibody develops against the homologous virus, it also happens that the antibody levels against unrelated strains of virus may rise, with resulting difficulty in diagnosis. Further, the viruses do not all make equally good antigens; and isolation of virus depends on the availability of newborn mice.

Until more experience is gained, available resources here are being used to investigate more fully a small number of outbreaks.—I am, etc.,

London, N.W.9. A. D. MACRAE.

Alcoholism in Britain

SIR,—In an interesting annotation under the above title (November 10, p. 1139) you say: "There has been an increase in moderate drinking and a decrease in convictions for drunkenness."

By and large this is undoubtedly true, for the convictions in England and Wales for 1950—*viz.*, 45,533—compare favourably with those for 1938 and 1939, which were 56,797 and 54,812 respectively. But since 1946 there has been a steady rise in the number of convictions every year, as the following figures (also for England and Wales) show:

1946	21,135
1947	25,541
1948	32,954
1949	34,050
1950	45,533

—I am, etc.,

London, S.W.1. SOMERVILLE HASTINGS.

*** Our annotator writes: These figures are lower than those for 1937–40. During the war there was a very marked decline and this has been followed by an increase. However, the broad statement in the annotation was meant to refer to the broad trend over the last 50 years rather than to fluctuations due to short-term changes in economic conditions. The broad picture is, of course, that there has been a very marked decline in convictions. In 1903 the figure stood at 209,385. Convictions decreased rapidly after 1913.—ED., *B.M.J.*

Biting Activity of Anopheles Gambiae

SIR,—Information on selection of blood meals by mosquitoes among a human population is limited. It is common knowledge that some individuals are more attractive to mosquitoes than are others, but adequate data on this subject are lacking. The recent account (*British Medical Journal*, 1951, **1**, 114) of selection of blood meals by Caribbean anophelines among families comprising many age groups forms the bulk of material available on this aspect of mosquito behaviour. The following brief account of a preliminary investigation into the feeding habits of *Anopheles gambiae* may be of some interest.

The habits of *A. gambiae* differ considerably from those of Caribbean mosquitoes studied by Muirhead Thompson. It is essentially an indoor, nocturnal mosquito, biting at all hours of the night, with no well-defined peak of activity. Observations were thus made between the hours of sundown and sunrise in native huts. The family under observation were asked to take up their usual sleeping positions and were inspected for resting anophelines at frequent intervals, while they slept, by the light of a small electric hand torch. The anophelines found were captured with an aspirating tube and placed in cages, a separate cage being allotted to each individual. Later these anophelines were killed and identified. A basal illumination, sufficient to allow caging of mosquitoes, was provided by a low-burning hurricane lamp.

The first observations were conducted at Rokupr, Sierra Leone Protectorate. A family of six, containing representative age groups, was observed for four consecutive nights. The numbers of mosquitoes collected from each individual are given in Table I.

These results do not agree with a postulated random selection of blood meal, rather it indicates that adults are relatively more attractive than children. Although among the adults there is some variation in attractiveness, as a group they are more attractive to *A. gambiae* than the group of children. The great difference in attractiveness lies between those of greatest age difference, the infant and the adult. The general tendency in this family is for attractiveness to vary with age.

TABLE I

Name	Age	Sex	Numbers of *A. gambiae* Collected				
			1	2	3	4	Total
Kamara	40 yrs.	M	46	12	29	50	137
Yabom Kargbo ..	20 ,,	F	34	43	28	63	168
Imma Kamara	18 ,,	F	29	30	27	51	137
Foday Kamara ..	10 ,,	M	12	21	7	27	67
Abu Kamara	5 ,,	M	10	10	10	10	40
Mabinki Kamara ..	2 ,,	F	3	6	3	4	16
Total ..			134	122	104	205	565

A series of similar observations (Table II) were made at Mafula, Sierra Leone Colony. The results obtained were more or less identical with those found in the Rokupr series. The difference between the adult and infant group is maintained. The 8-year-old Abdullai is, however, less attractive than his younger brother Sorie. The range of individual variation is greater.

TABLE II

Name	Age	Sex	Numbers of *A. gambiae* Collected		
			1	2	Total
Brima	20 yrs.	M	42	Absent	42
Fodia	15 ,,	F	31	30	61
Fatu	15 ,,	F	23	25	48
Koia	10 ,,	F	32	15	47
Abdullai	8 ,,	M	4	4	8
Sorie	7 ,,	M	16	11	27
Bura	4 ,,	F	4	2	6
Hai	2 ,,	F	Nil	Nil	Nil
Total ..			152	87	239

Both sets of data presented above refer to large families. However, all the subjects of malaria are not massed together in such fashion during the transmission period. Consequently a few examples of small families were investigated. The results obtained suggest that, given fewer potential blood meals to choose from, the attention of the mosquito is directed more at random. Numbers collected from some small families are tabulated in Table III.

TABLE III

Name	Age	Sex	Numbers of *A. gambiae* Collected
Brima	Adult	M	11
Yama	,,	F	21
Bassie	6 yrs.	M	10
Total			42
Salami	21 yrs.	M	17
Nane	18 ,,	F	27
Hai	2 ,,	F	7
Total			51
Spitia	20 yrs.	F	55
Sorie	5 ,,	M	45
Total			100
Labor	10 yrs.	M	17
Kafu	5 ,,	F	11
Total			28

Although these preliminary results cannot be considered conclusive, they suggest that *A. gambiae* shows preference for the adult members of a large family when selecting a blood meal. This behaviour is comparable to that of *A. albimanus*, *A. aquasalis*, and *A. bellator*.

Permission to report these findings has kindly been given by the D.M.S., Sierra Leone.

—I am, etc.,

Freetown, Sierra Leone. T. C. E. THOMAS.

Malaria

SIR,—At the risk of being snubbed as a has-been, I cannot resist the temptation to intervene in this discussion to support Dr. H. G. Calwell (November 24, p. 1280) in his advocacy of intramuscular injection of quinine and his tilt at that hoary old bogy, the risk of tetanus from it.

From 1903 to 1907 I served in the Indian station Sialkot, and took great interest in the treatment of malaria in white troops, even to the extent of sitting over the patients waiting for what I thought to be the optimum time for the administration of the quinine by mouth, the moment of sporulation. Having soon found that, however carefully I attended to this detail, I could

not prevent crescent formation, I determined to give quinine by the intramuscular route. I announced this intention to my S.M.O., and was warned that there was an order against it because of the risk of tetanus; therefore that if any case of this kind occurred under my care the responsibility would be mine. In a word, "I had been warned." Nevertheless I persisted. I did not believe that the tetanus which had been reported was not preventable; indeed the details of technique employed in a few of the cases about which there was talk seemed to me such as would encourage the introduction of tetanus in such a country as India. Nor did I believe a theory advanced about that time (I think on experimental grounds) that the area of necrosis formed in the gluteal muscles by an injection of quinine would encourage the development into bacilli of tetanus spores absorbed from the bowel and arriving at the necrotic area.

Naturally, with the patients' lives (not to speak of my Service career) at stake, I took very good care that no living tetanus should be injected either in the quinine or the medium in which it was dissolved, and no tetanus or local abscess occurred either then or after the many hundreds of intramuscular injections of quinine that, having practically abandoned oral administration, I gave in the next four years. The results were satisfactory; no case of malaria was invalided home from my service and the technique was held up by the Brigade's P.M.O. at that time as a model to be copied.

In an official report published in India during my service there, the author said that intramuscular injection ensured greater rapidity of absorption of the quinine. I could not believe that statement, because practically none of my patients showed any sign of cinchonism after intramuscular injection of 10 gr. (0.65 g.). I imagined that the secret of the greater efficacy of intramuscular injection was the slowness of absorption from the small area of necrosis, so that there was quinine in the circulation at the moment of sporulation of the parasite. Indeed, in later years, in a paper which was read by someone else in a public discussion on "606," I advanced the theory that the greater therapeutic efficacy of 606 when given by the intramuscular or the deep subcutaneous route as compared with that under intravenous administration was due to the slower absorption following the former method, and I used the analogy of the slower absorption following the intramuscular injection of quinine. I was not present at that discussion, but was interested to hear from the reader of the paper that the reference to quinine had aroused the ire of Sir Ronald Ross, who, I understood, was an opponent of the intramuscular route for administration of quinine. During the war of 1914–18, this old question being still like a red rag to a bull with me, I had some quite warm discussion on it with a disciple of Sir Ronald's.

—I am, etc.,

London, S.W.1. L. W. HARRISON.

SIR,—If I have succeeded in rousing some interest in the life-saving properties of quinine injections, even in these modern synthetic days, I feel my object has been achieved. This is really a serious matter, as regrettable incidents which recur from time to time amply demonstrate and which are especially liable to happen in this air-borne age. I am, therefore, indebted to Mr. P. G. Shute and Dr. H. G. Calwell (November 24, p. 1280) for their support.

I have never really appreciated the doubts and disbeliefs that exist on this subject and must differ from Sir Gordon Covell in dismissing it in two disparaging sentences, as in your issue of October 27 (p. 1021).

Who indeed has seen tetanus in these modern days as the result of quinine injections? I certainly have not, and I think that I can claim having experienced as much of this treatment as anyone extending over a period of 40 years. It is true that nearly half a century ago a stir was made by Sir D. Semple (*J. roy. Army med. Cps*, 1912, **19**, 323) in his experiments with guinea-pigs. But then it was scarcely realized that when tetanus or sepsis ensued, due to staphylococci, streptococci, pneumococci, or other organisms, it was the result of a fixation abscess. Sterile abscesses due to toxic necrosis do certainly occur, but they are, as I pointed out many years ago, due to abuse of this injection or too massive a dose of quinine. There are in reality no indications for more than one or at the most two injections. It should not be one's aim to convert one's patients' buttocks into pin-cushions. I myself have only experienced in my practice two instances of abscess following quinine injection, and these were certainly cases of fixation abscess due to some focal sepsis: in one it was due to a small boil on the skin and in the other to prostatic sepsis. In both it was shown that a staphylococcus in the former and a streptococcus in the latter were of the same strain as the primary lesion. In the case of tetanus it is probably the same process and is only liable to ensue in those areas where tetanus spores are present in the soil, and where they gain entrance to the intestinal tract.

In the case of sterile abscesses it is clear that due attention must be paid to the *p*H of the quinine solutions employed. During the first world war in Palestine, September to December, 1918 (see *J. roy. Army med. Cps*, 1923, **42**, 321, 416), I had the opportunity of examining this question in the living as well as in the dead on an almost unprecedented scale. Time and time again I was able to show that ramifying cellulitis of the buttocks was due to multiple quinine injections at the same site. Do not let us bring up this bogy when it is a question of saving life. In these days of sulphonamides and penicillin this method is certainly safer than it used to be. There have been many occasions both during and since the termination of the second world war when I have seen lives saved by intravenous or intramuscular quinine when other synthetic drugs such as mepacrine and "paludrine" have failed.

The fact is that at present we possess no single drug which has such a rapid action on the subtertian trophozoites as has quinine (see Davy, D. G., *Brit. med. Bull.*, 1951, **8**, 43).—I am, etc.,

London, W.1. PHILIP MANSON-BAHR.

"Primary Atypical Pneumonia"

SIR,—In the interesting paper of Squadron Leader Philip W. Robertson and Dr. K. D. Forgan Morle (October 27, p. 994) the viral origin of the pulmonary lesions in atypical pneumonia is doubted and the latter are considered to result from the aspiration of products from an associated upper respiratory tract infection. I would like to mention three cases in which an abnormal shadow was noticed in the lungs on routine mass radiography. At the time when this abnormal shadow was first found to be present each of these patients was perfectly well and free of symptoms and there were no signs of an upper respiratory infection; between two and five days *afterwards*, however, each developed a running nose and cough. These symptoms and the radiographs had completely cleared at the end of a further three weeks.

It would seem that these are in favour of an infection which commenced at the lower end of the respiratory tract rather than a mechanical aspiration of material from the upper respiratory tract. These cases were part of a series very similar to that which was described by Squadron Leader Robertson and Dr. Forgan Morle, but they were not sufficiently ill to report sick and were discovered only by routine mass radiography; a number of these radiographs showed similar small areas of pulmonary collapse (*Brit. J. Tuberc.*, 1951, **45**, 15).

There would seem to be no reason why any infection should not commence at any point in the respiratory tract; in some cases this may be followed by a small area of pulmonary collapse, a secondary phenomenon, and caused by aspiration of material from the upper respiratory tract or local inflammatory exudate and swelling of the mucosa. It is felt that this type of minor respiratory infection, which may be overlooked in the absence of physical signs and may not be an infrequent occurrence, may be of importance in the natural history of chronic lung disease and so deserves careful attention.—I am, etc.,

London, S.W.10. D. G. WRAITH.

SIR,—Squadron Leader Philip W. Robertson and Dr. Forgan Morle (October 27, p. 994) have produced good evidence to support their thesis that segmental collapse following upper respiratory infections is a common event, and this accounts, no doubt, for many cases of so-called primary atypical pneumonia. This syndrome has been recognized since it was described in 1939 (Ramsay, H., and Scadding, J. G., *Quart. J. Med.*, **8**, 79). They go too far, however, when they suggest that no atypical pneumonias are due to as

yet unisolated viruses. On the experimental side Dr. Stuart Harris (November 10, p. 1152) has shown that known viruses do cause similar segmental lesions in animals. Clinically, I see a fair number of pneumonias which I am confident are of viral aetiology. It would be difficult to explain an enlarged spleen and meningeal symptoms with, sometimes, a cerebrospinal fluid pleocytosis (common symptoms in these cases) on the grounds of segmental pulmonary collapse. However, the greatest support for virus pneumonia being a true disease comes from the periodic epidemic incidence, a recent instance of this being a family in which three members developed atypical pneumonia with splenomegaly. I believe that a rising titre of cold agglutinins and agglutination against *Streptococcus MG* are of significance. Q fever and the ornithosis-psittacosis group of diseases are always excluded serologically in these cases.

I do agree that primary atypical pneumonia (meaning virus pneumonia) is a diagnosis too readily made, often on insufficient evidence. Squadron Leader Robertson and Dr. Forgan Morle have to be congratulated for reminding us that segmental collapse not uncommonly follows upper respiratory infections. This possibility should always be considered before a diagnosis of virus pneumonia is made.—I am, etc.,

Bristol. G. DONALD W. MCKENDRICK.

Rupture of the Spleen

SIR,—The recent correspondence (September 8, p. 739, and later) and annotation (November 3, p. 1077) on this subject has been of interest to me. In 1946 I published (*Irish J. med. Sci.*, 1946, 725) a series of six cases of traumatic rupture of the spleen, five of which were seen and operated on during the years 1942–4. Since that time I have observed the results in two other cases in Dublin. Of the eight cases, falls were responsible for the ruptures in five patients, rugby football injuries in two, and run-down injuries in one. Five of the cases were children; one child (8 years) who had been run over *nine* hours previously died on the operating table, and one adult (46 years) died on the seventh day from heart failure. The other patients made uninterrupted recoveries and are perfectly well to-day.

From a review of the literature undertaken at this time it was demonstrated that the mortality for traumatic rupture of the spleen was in the region of 30%. This high mortality was attributed not to operative interference but to failure to diagnose the condition until it was too late. In spite of modern advances in treatment of shock and operative technique this mortality figure will still remain high unless house-surgeons and casualty officers become more aware of the early signs and symptoms of ruptured spleen.

I was convinced at the time that delay in diagnosis was a major factor in our two fatalities. The delay occurs in the majority of cases owing to:

1. Failure to recognize the possibility of injury to the spleen, owing to the supposed trivial nature of the fall or trauma.
2. The apparent well-being of the patients when seen after the initial shock has passed.
3. The reliance for diagnosis on the recognition of the classical signs of internal haemorrhage.
4. The absence of Kehr's sign (pain in the shoulder), or the failure to recognize its significance.

In run-down or crush accidents when the ribs or abdomen are involved rupture of the spleen should be suspected and every possible diagnostic method should be employed. In cases of multiple injuries to head and limbs it may be easily overlooked in the general treatment of the injuries. In children, falls from a height, and particularly falls against chairs, gates, and other hard objects no matter how trivial, must be fully investigated.

Rugby football injuries are notoriously deceptive. The player who, after a hard awkward tackle, is winded and has been subjected to the familiar knee-pumping technique by his fellows may play on and collapse after the game. In the late twenties a fellow player of mine received such an injury, played on, and died next day in hospital. Post-mortem examination revealed a ruptured spleen. In a case described by me the patient played on for ten minutes before feeling faint. In a recent case in Dublin the boy played on for ten minutes afterwards, but was diagnosed some hours later. These three players *walked into hospital.*

Almost every textbook describes Kehr's sign (pain referred to the shoulder), and students will trot it out as being pathognomonic. It is important to note that this sign is present in only a small proportion of cases in the early hours after injury to the spleen. Robitshek (*Minnesota med. J.*, 1923, **6**, 365), reviewing 127 cases, found it present in only 7.8% of patients. In various recent articles on diagnosis of splenic rupture its absence has been noted. However, Galloway in describing a patient noted that "shoulder-pain, especially that moving from uppermost shoulder to the shoulder on which the patient was recumbent was a marked feature" (*Brit. J. Surg.*, 1935, **23**, 235). The clue given here, together with my own observations in cases of internal haemorrhage from other causes (ectopic pregnancy, etc.) led me to try the effect of recumbency with elevation of the end of the bed in suspected cases. In several patients suffering from suspected ruptured ectopic pregnancy, and in patients with ruptured spleen, the procedure led to an instant complaint of shoulder-tip pain, sometimes unilateral and sometimes bilateral.

I suggest, therefore, that before pronouncing that Kehr's sign is negative in suspicious cases, and as a method of diagnosis, the patient should be asked to lie down flat with the end of the bed raised on blocks. If there is free blood in the abdominal cavity the patient will complain of shoulder-tip pain within a few minutes. This modification of Kehr's sign is, in my opinion, of distinct value in diagnosis. Since 1946 my colleagues and I have proved the value of this manœuvre in many cases of internal haemorrhage.

In my paper I pointed out that the description of internal haemorrhage in surgical textbooks is misleading and should be rewritten. If surgeons were to wait for the textbook signs of internal haemorrhage in cases of ruptured spleen and ectopic pregnancy many patients would die. The signs and symptoms described in most textbooks are terminal signs. The cold, sweating, white patient with thready pulse, restlessness and air-hunger usually dies before anything can be done. I am convinced that many cases of internal haemorrhage would be saved if this picture of impending death was relegated to the end of the chapter on haemorrhage. Much greater attention should be paid to the *early* signs of intra-peritoneal bleeding, of which by far the most valuable in our experience has been the modification of Kehr's sign described above.—I am, etc.,

Dublin. T. C. J. O'CONNELL.

Diabetic Gangrene

SIR,—I have read with interest the article by Dr. A. Grunberg, Mr. H. L. Davies, and Dr. J. L. Blair (November 24, p. 1254), and would like to support their plea for conservative surgery in the treatment of this condition. The view attributed to me in connexion with five-toe amputation calls for some amplification. I believe that this operation is indicated when, in addition to gangrene of one toe, one or more of the other toes shows signs of severe vascular disease, such as discoloration or superficial ulceration, etc. It is perhaps significant that none of the comparatively few cases in which I have had all five toes amputated has required further surgery, and the functional results have been excellent.

I would also like to emphasize the importance of the neuritic factor in both young and old diabetics in whom the diabetes is of long duration. Gangrene may occur, in spite of an excellent blood supply, as a result of trauma to an insensitive foot; I have recently seen several such cases, in one of which bilateral gangrene of the big toe followed the wearing of a tight pair of shoes. In the same connexion it is important to realize that neuropathic joint changes are not very rare in this type of case, and that this lesion may readily be mistaken, even radiologically, for an infective condition of bone, especially when it is associated with an

adjacent area of superficial gangrene or a perforating ulcer. The importance of sepsis and ischaemia and their common association in lesions of the feet in diabetes are well recognized, but if unnecessary surgery is to be avoided the importance of anaesthesia due to neuritis must also be remembered.—I am, etc.,

London, W.1. WILFRID OAKLEY.

Childhood Factors in Duodenal Ulcer

SIR,—Dr. T. D. Kellock (November 10, p. 1117) is to be commended for his carefully controlled study which should serve as an example in methodology. Too often are psychiatrists lacking in the objectivity necessary to thoroughgoing research. One doubts, however, if Dr. Kellock is conversant with current psychosomatic formulations. He takes as his point of departure the premise that most authors regard duodenal ulcer as a disease which is caused, in part at least, by the patient's possession of an ulcer personality. This is very well so far as it goes, but when he proceeds to employ such data as size and composition of family, age at death of parents, education, illness in childhood, and social class as his yardsticks of personality, he is out of tune with modern knowledge of personality evaluation. An account of psychological factors without reference to feelings and attitudes would seem to be of questionable validity. Above all, failure to utilize the concept of *conflict* occurring in the face of specific life-situations is to ignore one of the cornerstones of our psychological insight into both childhood and adult emotions. Personality is not a static entity to be described anatomically like the surfaces of the liver. It is to be understood rather in the dynamic terms of conscious and unconscious drives being made by internal and environmental frustrations.

Dr. Kellock does not seem to have offered any effective challenge to the formulation proposed, among others, by F. Alexander (*Psychosomatic Medicine*, Norton, 1950) that in duodenal ulcer one is dealing with a conflict area that has to do with dependent/independent needs, and that ulcer patients do have dependent needs which are repressed, with a tremendous compensatory over-determined need for striving and achievement.—I am, etc.,

Glasgow. A. BALFOUR SCLARE.

Psychosomatic Medicine

SIR,—Your leading article (November 10, p. 1136), which throws cold water over the concept of psychosomatic medicine, must have been a great disappointment to many.

In spite of the increasing efficiency of medicine and surgery a group of patients is left almost neglected—that suffering from psychosomatic disorders. The physician has too little training in psychiatry, the psychiatrist has too limited a knowledge of general medicine, and neither has the time or patience to deal with the special problems of this group. The patient, who needs sound diagnosis, the right drugs, and psychological readjustment, falls between two stools and rarely has his needs met. Is psychosomatic medicine an illusion? Should the term be discarded? I think definitely not.

In the genesis of psychosomatic illness most would agree that several factors are involved. Among these are heredity, childhood experiences, character, and stress. These factors have to be studied collectively. One cannot destroy the validity of a diagnosis of psychosomatic disease merely by showing that in a particular condition—say, duodenal ulcer—the childhood experiences of a group of affected individuals do not differ from the experiences of a control group. Surely a careful study of the remaining factors is essential, as these may be of greater importance. And are cold statistics any guide to subtle points of difference?

My own assessment of a small group of asthmatics gives the following picture. Of 12 recently seen, six had experienced major personal misfortunes, five were suffering from a significant lack of affection, eight showed evidence of marked suppression of emotion, three lived in fear of death or were affected by a severe phobia, and two had major defects of personality. It is the experience of many physicians that status asthmaticus is precipitated by psychological trauma. Perhaps lives would be saved by probing into the psychological history and dealing with the problems brought to light.

In thyrotoxicosis it is surprising how often one can confirm the observations of George C. Ham and others that the patient has a non-aggressive yet ambitious personality and has had to shoulder heavy family responsibilities without having reached adequate maturity.

Human personalities are too complex to classify in neat groups, but, in the study of psychosomatic diseases, surely definite patterns of personality and experience are beginning to emerge. We know the important part played by emotion in the activity of the body's hormonal and autonomic systems. On theoretical grounds, therefore, the concept of psychosomatic disease appears to be sound. I would suggest that we cling to the name psychosomatic medicine and that we devote more thought and energy to it, particularly as regards treatment. Finally, I hope that these efforts will receive more encouragement.—I am, etc.,

London, W.8. A. POTELIAKHOFF.

SIR,—In the first two years of the war an attempt to correlate types of personality with symptoms failed to reveal any significant findings in a series of psychiatric out-patients of a large London hospital. In Burma in 1945 I investigated the histories of 300 psychiatric casualties, hoping to be able to identify some constant findings in view of the fact that so many of them had been subjected to similar stresses. They were analysed and classified according to neurotic constitution, predisposition to neurosis, battle experience, personality, intelligence, civil state, age, and so on. It was found impossible to correlate types with symptoms. Unequivocal hysterical personalities did not necessarily develop hysterical disabilities, while many of the best types seemed to be just as prone to neurotic breakdown as the predisposed. By virtue of individual variants, such as constitutional endowment, environmental influence, psychological reactions and personality, no two persons can be expected to exhibit comparable illness when health and stability break down.

It is not so very surprising, therefore, that attempts to correlate personality types with psychosomatic syndromes have proved so inconclusive. But this is no good reason for abandoning the term "psychosomatic," or the concept of psychosomatic illness, which has materially helped to integrate psychiatric with organic disorders. When aetiology is obscure and diagnosis in doubt, there should be no objection to the term "psychosomatic" if emotional factors are involved or suspected. Until such time as there is a more harmonious blending of psychiatry with general medicine would it not be as well to refer to psychologically minded physicians and medically minded psychiatrists as psychosomatic specialists?—I am, etc.,

London, W.1. ELLIS STUNGO.

SIR,—All serious students of psychosomatic medicine will welcome the carefully meditated survey of the subject given in the leading article (November 10, p. 1136). Some of its inferences, however, are so ambiguous and the total impression it creates so nihilistic that a short critical supplement seems necessary.

The leader writer accepts unreservedly that an individual who is emotionally upset shows "striking bodily disturbances of the secretion, vascularity, and motility of the viscera" and he cites the admirable work of Wolf and Wolff in this field. He accepts, too, that emotional stress may aggravate an already existing "disease process" but he is hesitant to go further and, indeed, digs in his toes with the statement: "There is no convincing evidence that emotional stress initiates a disease process." Yet having written this he shows his uncertainty and goes on to write, "There is a possibility that in a small number of individuals

intense emotional disturbances might lead to physical change—e.g., an acute gastric ulcer causing haemorrhage." At this point he again oscillates by adding: "But it is more likely that an acute ulcer already present has been stimulated into further activity." But why is it *more* likely? Besides, what exactly does the writer intend by "disease process"? If he means by this term to refer to demonstrable organic change, would he include under it, for instance, the marked congestive state of the stomach observed by Wolff in his study of the man with the gastric fistula, who at times of intense resentment showed this phenomenon, which in turn rendered the mucosa liable to ulceration in the presence of minimal traumata? Altogether it would seem that a truer account of our state of knowledge (or ignorance) would be: There is no convincing evidence that emotional stress may *not* be important in initiating a disease process. Or better perhaps: When a patient is examined psychologically we get one set of findings and when he is examined physically we get another set of findings; and when *this* is related to *that* there seems to be some correspondence between them although the nature of this correspondence is still imperfectly understood.

Another point emphasized by the writer of the survey was this: "No convincing evidence exists to prove that psychosomatic groups of diseases may be acquired by virtue of a specific personality." This conclusion is indisputable in respect of attempts hitherto made to test the validity of such a hypothesis. But it does not dispose of the problem of the observable varying psychosomatic sensitivities of individuals to various emotional stresses. In any case personality is a highly complex function and the procedures hitherto adopted may well have failed to isolate and identify special emotional characteristics and their physiological concomitants such as conceivably may be of immediate relevance in the development of bodily diseases. The position is further complicated by what I once called "the phenomenon of associated, sequent, and substituting affections" whereby one and the same person may develop a sequence such as duodenal ulcer, fibrositis, and hypertension—to name one which is not uncommon. The survey, however, takes no account of this nor does it mention another relevant phenomenon—namely, that of the changes in the prevalence of many disorders which have affected both the age of onset and sex distribution as well as their general incidence. These changes must be relatable either to changes in environment or to changes in personality (in the sense of sensitivity characteristics) or to both.

The writer, towards the end of the survey, announces that the psychological approach to illness cannot reveal any major aetiological factors—"emotional tension may best be regarded as an aggravating factor in the same category as, for example, fatigue or over-smoking." Such a conclusion seems to be very much at variance with the findings when a psychosomatic approach is applied in everyday practice. Yet, having thus minimized the importance of psychosomatic medicine, the writer again oscillates and describes it as basic medicine, which, however, as he frankly admits, is far from generally practised. Which seems a rather perplexing state of affairs if the subject is, as it is, basic to medicine.

The writer finally pronounces "psychosomatic" to be "an unnecessary term, and the sooner it is dropped from the current medical literature the better." This semantic obliteration would be permissible, even laudable, if the method of psychosomatic medicine were generally taught and practised as an accepted routine discipline. For it is more than a mere point of view (as the writer calls it) and takes account of realities inevitably ignored by a purely somatic medicine, and it requires knowledge of at least one specialty—namely, psychological medicine. To drop the term now would surely be premature, as the existence of the word, originally coined to meet a need, serves to remind us of the need, which still exists, to take a proper account of the emotions not only in respect of the sicknesses of individuals but also those of groups.—I am, etc.,

Glasgow. J. L. HALLIDAY.

Danger of Extracting Many Teeth at Once

SIR,—May I be allowed a last word in this correspondence? I never asserted that there was no or less dental disease on the Continent, or anywhere else, than in this country, but plainly that the people kept their teeth longer than they do now and here. This is demonstrably true, as every newcomer to this country can tell Mr. O'Brien. The difference is not so much in the prevalence of dental disease as in its treatment. If the people in Austria, for example, kept their teeth, and the people here have shiny artificial ones, that shows only that the Austrian dentists were more conservative. A few facts will illustrate the difference in outlook. In Austria, when a girl lost her teeth through the fault of somebody else she was awarded, as a rule, special damages for diminished expectation of marriage. In the Austrian army, before the first world war, young men (of 21) with defective teeth were rejected. In this country, one of the first news items I read was about a girl who was attacked by a man, and nearly choked because her false teeth slipped into her throat. She was 20! And quite recently a young man was fined for being under the influence, etc. His excuse, rightly or wrongly, was that when celebrating his 21st (!) birthday he had only a few drinks but could not eat because his new false teeth did not fit.

It appears to me that, quite apart from the treatment, the state of the teeth in this country is deplorable, and there ought to be nation-wide education and propaganda for healthy teeth. To begin with the medical profession, I think it would be a good idea to send to every practitioner a wall chart of the different foodstuffs, with their mineral and vitamin contents, raw and cooked, and at different seasons, according to the latest state of knowledge, perhaps with short notes on their significance. The Ministries of Health and of Food, together with the M.R.C. and the B.M.A., could take the responsibility for that. Secondly, the children should be trained in mouth hygiene at school, which could be part of P.T. if not otherwise. Since the school age in this country begins at 5 years old, one year earlier than in many other countries, this endeavour promises to be fruitful. Of course, in the case of nursery children, one can start even earlier. Thirdly, by putting the school dental clinics into working order again, but for conservative treatment as well as extractions. By getting used to fillings at an early age, the children would not have this idiotic dread of the drill which forces many dentists to extractions against their better intentions. Furthermore, the importance of dental health should be impressed on the parents, a job for the parents-teachers associations, and lectures about teeth and their conservation should be given in adult classes, evening institutes, W.E.A., women's institutes, etc., etc. Lastly, but perhaps most important, I would appeal to the authorities of the N.H.S. to keep a watchful eye on all applications for extractions, especially in the case of younger persons, and/or mass extractions. It will help the conscientious dentist against unreasonable demands.

I don't think this list of proposals complete, or that it could not be improved on. I certainly shall not claim any priority rights, but I wish something would be done, energetically, and for heaven's sake soon.—I am, etc.,

Birmingham. I. E. REICHENFELD.

POINTS FROM LETTERS

Dangerous Iron Tablets

Dr. K. B. KAPUR (Blackburn) writes: While it will be helpful to change the colour of ferrous sulphate tablets to one not so attractive—e.g., black—and to mark the tablets "Dangerous for Children," the suggestion regarding wrapping the tablets in paper is a very practical one. It will be better, however, if these tablets were put up in cellophane wrapping, just as tablets of "aspro," etc., are. Not only will it be easier for the chemist to dispense, but it will be easier for the patient to clip off the number of tablets desired out of the packet and to leave the rest still sealed. Above all, it will be much more difficult for the toddler to unseal the wrapping and consume its contents.

Counterblast

Dr. A. S. SIMPSON (Ashton-under-Lyne) writes: . . . Perhaps the bulk of articles in this *Journal* do not quote numerical data, or, if they do, the treatment of such data requires such simple analysis that the papers do not disturb the mood of quiet enjoyment of the trumpeters who scan them. But must the clinician be abjured from using the methods of exactitude in the analysis of his findings lest the presence of mathematical symbols should frighten and disturb the peace of those who do not appreciate their value? In the advance of knowledge, medicine must use the tools of science or be left behind, and the physician who submits statements of fact arrived at "in the light of his experience," but who would be unwilling to subject his results (where appropriate) to statistical analysis, is merely being pontifical.

Obituary

CLEMENT A. FRANCIS, M.B.

The sudden death of Clement Francis, surgeon to the Metropolitan Ear, Nose, and Throat Hospital, from coronary thrombosis on November 27 at the early age of 53 came as a great shock to his many friends.

Clement Alexander Francis was born at Sherwood, Queensland, on March 3, 1898, the elder son of Dr. Alexander Francis, a well-known ear, nose, and throat surgeon in Brisbane, who originated the theory that asthma was frequently due to vasomotor instability. He came to England as a boy when his father returned to practise as an asthma specialist in London, and was educated at Mostyn House, Cheshire, and St. Edward's School, Oxford. He served in the first world war as a lieutenant in the R.F.A. in Palestine, and on demobilization went to St. John's College, Cambridge, his father's old college, where like him he became captain of the Lady Margaret Boat Club. From Cambridge he went to St. Bartholomew's Hospital, qualifying in 1925, and graduating M.B., B.Ch. a few years later. It was natural he should follow in his father's footsteps and specialize in E.N.T. surgery. After various house and clinical appointments in London, and postgraduate work in Vienna, he was appointed surgeon to the Metropolitan Ear, Nose, and Throat Hospital.

He was an expert surgeon. He had the most gentle hands and a wonderful way with patients. He soon built up a large consulting practice in E.N.T. surgery in addition to carrying on his father's treatment of asthma by lightly cauterizing the nasal septum. He started and was surgeon in charge of a large allergy clinic at the Metropolitan Ear, Nose, and Throat Hospital, where he demonstrated the technique of nasal cauterization for asthma to postgraduates who came from all over the British Isles, from the Commonwealth, Europe, and the U.S.A. He was on the council of the British Association of Allergists, as well as being its treasurer; and his last paper on allergy was read at the International Congress of Allergists at Zurich in September, 1951.

He contributed a considerable number of papers to the medical journals on asthma, hay-fever, and allied subjects, and was the first to stress the importance of "aspirin sensitivity" in asthmatic patients. In 1950 he published a small book on asthma in which, in addition to the usual remedial treatments, he described in full detail the technique of the method of nasal cauterization he employed. This book was intended to be the forerunner of a larger and more elaborate work which he had just started.

He was a fine all-round athlete; an excellent cricketer, a member of the M.C.C., and a first-class golfer. For years he was an active member of the Marylebone Rotary Club; but it is as senior honorary secretary of the Hunterian Society that his loss will be most felt. He threw himself heart and soul into its activities. Much of its success in recent years has been due to his stimulating personality, organizing ability, and infectious enthusiasm.

His patients loved him. His colleagues had a deep affection for him. He was everybody's friend. His sudden death, so unexpected at the height of his career, has made a gap which will be hard to fill. He will be sadly missed. He leaves a wife, a son, and two daughters, to whom we offer our deepest sympathy.

HENRY A. CHRISTIAN, M.D., LL.D.

Professor Henry Asbury Christian, Hersey Professor of the Theory and Practice of Physic at Harvard Medical School from 1908 to 1939, died on August 24 at Whitefield, New Hampshire, aged 75.

Henry Christian graduated in medicine at Johns Hopkins University school of medicine, Baltimore, in 1900. His first appointment was as assistant pathologist at the Boston City Hospital from 1903 to 1907. He held a similar post at the Children's Hospital. A year later he went to Harvard as professor of medicine; he was also dean of the faculty of medicine there from 1908 to 1912. At the end of the first world war he was appointed resident chairman of the Division of Medical Science of the National Research Council. A president of several medical societies in the United States, he received the Distinguished Service Medal of the American Medical Association at its Centennial Session in 1947. Professor Christian, who came from a well-known New England family, married Elizabeth Sears, of Seabury, a descendant of one of the *Mayflower* settlers.

Professor Sir John McNee writes: Christian must be almost the last of the famous students and teachers trained in medicine at Johns Hopkins by Sir William Osler. Osler left Johns Hopkins for Oxford in 1904, but prior to that Christian had already moved to Boston as assistant pathologist to Boston City Hospital. His promotion was rapid, and he became professor of medicine in 1908 and physician-in-chief of the Peter Bent Brigham Hospital from 1910 to 1939. His surgical colleague at the Brigham was Harvey Cushing, another Hopkins man. The influence of Johns Hopkins on the Harvard Medical School during the present century has thus been profound, and continues to this day in the persons of several of the clinical professors. It would be impossible to enumerate here all Christian's clinical activities and all the honours bestowed on him in his own country and beyond it. He was the author of a well-known book on *Diagnosis and Treatment of Diseases of the Heart* (first published in 1928), and the editor of the thirteenth and subsequent editions of Osler's *Principles and Practice of Medicine*. In Britain he was perhaps best known as editor of *The Oxford Medicine*, really a series of loose-leaf monographs published by the Oxford University Press.

I last saw Professor Christian at Boston in 1949. He was looking old, tired, and was obviously rather lonely. Clearly he did not quite approve of the biochemical march of modern American medicine, and he realized that the old clinical era of bedside physical signs, with their foundations on pathology, was slipping away. He recalled with pleasure his old friends in Britain, notably Rolleston and Hale-White, and had many anecdotes about them. Christian's death must very nearly end the period of Sir William Osler's personal and direct influence on the clinical teaching of medicine in America.

Dr. JANE OGILVIE MILLAR (née French) died in Preston on November 10. After studying medicine at Glasgow University, where she graduated M.B., Ch.B. in 1933, she was appointed to the resident staff of the Glasgow Royal Infirmary and later to the Ruchill Fever Hospital, Glasgow.

In 1936 she took the D.P.H. (London), in 1937 the D.R.C.O.G., and in 1939 she proceeded M.D. Her first post in the public health service was as assistant medical officer of health in Coventry. Later she had some experience of general practice. In 1943 she went to Darwen as acting medical officer of health and school medical officer, and when the National Health Service came into being in 1948 she became an assistant divisional medical officer to the Lancashire County Council, her main duties continuing to be in Darwen. Dr. Millar's exceptional ability was highly regarded by her colleagues in all branches of medicine and by members of local authorities as well as by the general public. To her sound clinical skill she added ability and decision as an administrator. Some three years ago she had a severe operation, and, although calmly aware of the doubtful prognosis, continued to work until incapacitated in the middle of a day's work, some four weeks before her death. In her last conversation, a few hours before finally losing consciousness, she gave instructions about public health cases requiring action, and discussed her own case with impartial but well-informed clinical interest. Her quiet unemotional courage leaves a deep impression, and in her we have lost a devoted doctor whose epitaph may justly be written, "A valiant woman." She leaves a husband and a young daughter.—R. C. W.

Dr. RICHARD CLAYTON ALLEN, of Belper, Derbyshire, died on November 11 at his home, after a long illness patiently borne. He was 69 years of age. After studying medicine at Birmingham University he qualified in 1907. He held various house appointments in the Queen's Hospital, and then took the D.P.H. in 1910. During the first world war he served in the R.A.M.C. in India. On demobilization he joined his father at Belper in a practice founded by his grandfather. By hard work and with a good knowledge of medicine, which he kept up to date, together with shrewd common sense and a well-developed knowledge of human nature, his practice rapidly increased. In later years, even with the help of a younger partner, he was continually overworked, until eventually his health began to suffer. He was the best type of family doctor, being eager to do his best, especially for his poorer patients, often without any hope of monetary reward. He was trusted and esteemed as a friend as well as a doctor, and many used to come to him for advice and assistance in matters other than those immediately concerned with health. His acts of kindness were often unobtrusive and unrecognized except by those immediately concerned. Behind a somewhat grim exterior his nature was upright and sympathetic; yet he could not bear humbugs of any sort, and was not prone to suffer fools gladly. He was seen perhaps at his best at work at the Babington Hospital, where he had been medical officer for 28 years. It was an education to go round the wards with him and watch the effects of his cheery disposition on some of the aged inmates. His colleagues regarded him with respect and affection, and he was keen to call on their assistance in time of need; in return he was always eager and happy to be of help to them when it was required. In addition to his extensive practice Allen held numerous public appointments. He was a county magistrate, medical officer of health of Belper urban and rural district councils, medical officer to the Belper Isolation Hospital, county surgeon to the St. John Ambulance Brigade, a past president of the Derby Medical Society, a past chairman of the Derby Division of the B.M.A., and for many years a keen member of the local panel committee. He was also chairman of the Belper Social Service Centre and of the Conservative Club, and president of the local branch of the British Legion. He was a keen Freemason, being a Past Master of the Beaureper Lodge. In consequence Allen had little time for leisure, but occasionally he took an afternoon off to take part in his favourite sport of shooting. He will be sadly missed by his patients and by his friends and colleagues. At the funeral service the church was crowded by those wishing to show their respect for him and sympathy for his widow and son.—F. G. L.

Medical Notes in Parliament

X-ray Film Supplies

Dr. S. W. JEGER asked for information from the President of the Board of Trade on November 26 about the steps being taken to alleviate the shortage of *x*-ray film in hospitals. Mr. PETER THORNEYCROFT said that the amount of *x*-ray film supplied to the home market was likely to be about 7½% greater than in the preceding year. In spite of this some hospitals were experiencing difficulty because of the steady increase in the demand of the medical service as a whole. A small increase in supplies was expected in the next few months, and a substantial increase next year, as a result of a major expansion in output. In the meantime arrangements had been made with the manufacturers to make emergency supplies available to hospitals in great need. Small quantities of medical *x*-ray film were being imported from Belgium and of dental *x*-ray film from the United States.

Poisonous Duck Eggs

Mr. B. BANNER on November 26 asked the Minister of Food whether he was aware that duck eggs may be poisonous unless boiled for at least 10 minutes, and should be eaten within three or four days unless kept in refrigerators. He requested the Minister to arrange for printed cards giving this information to be placed prominently on the counters of all shops where duck eggs were sold. Dr. CHARLES HILL replied that there was some slight risk of infection which made it desirable to cook the eggs thoroughly, but he thought the point had already been given wide publicity and such cards were not necessary. (But see also p. 1410.)

Regional Hospital Boards

Mr. H. F. C. CROOKSHANK in reply to Mrs. E. HILL on November 27 gave for each regional hospital board the number of medical staff other than those assigned to hospitals, and the number of non-medical staff employed by each regional hospital board, excluding in each case blood transfusion centre and mass radiography staff. The figures were:

Regional Hospital Board	Medical Staff	Non-medical Staff
Newcastle	3	87
Leeds	5	96
Sheffield	5	80
East Anglian	4	84
North-west Metropolitan	4	160
North-east Metropolitan	5	107
South-east Metropolitan	5	108
South-west Metropolitan	4	158
Oxford	4	68
South-western	4	85
Welsh	6	141
Birmingham	3	110
Manchester	5	98
Liverpool	5	129
Totals	62	1,511

Maternity Beds in Scotland

Replying to Mr. HECTOR HUGHES on November 27, Mr. J. STUART stated that the number of hospitals in Scotland with beds set aside for maternity cases was 100, the number of maternity beds being 2,862. Over 60% of the expectant mothers in Scotland now had their babies in hospitals and other institutions, and the maternal mortality rate was just over 1 per 1,000.

Tuberculous Patients in Switzerland

Mr. J. STUART on November 27 reported that 180 tuberculous patients had been flown to Switzerland since June. This completed the original programme and no further flights would be made during the winter. When patients returned on the completion of their treatment they would be replaced by others.

Medico-Legal

FINE FOR LEAVING DRUGS IN CAR

[FROM OUR MEDICO-LEGAL CORRESPONDENT]

By Article 4 of the Dangerous Drugs Regulations it is provided that every dangerous drug or preparation in the custody of an authorized person must be kept in a locked receptacle which can be opened only by him or another authorized person, except when the necessities of the practice of his profession, function, or employment otherwise require.

On May 4 a doctor pleaded guilty at Chatham Magistrates Court[1] when summoned for keeping dangerous drugs otherwise than in a locked receptacle, and was fined £10 and £2 2s. costs.

The circumstances were that on the evening of March 20 a soldier opened the door of the doctor's car, which was standing outside a hotel where the doctor was visiting a patient, and abstracted a case containing morphine, codeine, and phenobarbitone. He took it back to barracks with him and put it under his bed, but in the morning turned it over to the military authorities. The doctor meanwhile had noticed his loss when he got back to the car, and immediately reported it to the police. He had had the bag with him because on a previous visit he had had to administer morphine, and he was driving a strange car while his own was under repair, which was why the car door was not locked.

What is a Receptacle?

Even if the car doors had been locked the doctor would still have been in breach of the regulation. It was decided by the King's Bench Divisional Court in October, 1949,[2] that a locked motor-car is not a "receptacle" within the meaning of Article 4. In that case the doctor had left drugs in an unlocked case inside a locked car, and the whole car was stolen.

The Lord Chief Justice, Lord Goddard, in deciding that a breach of the regulations had been committed because a car was not a "receptacle," pointed out that he was deciding the case on its own particular facts, and that he was not speculating what the results would have been if the case itself had been locked, or if there had been a locker in the car in which the drugs had been kept under lock and key.

There has been no judicial guidance since 1949 on what is or is not within the regulations. It cannot be said with any confidence that a locked case lying in the car would not be a breach. It is more likely that the courts would decide that a locker which was part of the car, just as the drug cupboard is part of the house, would be a "receptacle." It is probably wise as a matter of law, as it is of common sense, not to leave dangerous drugs in a car at all.

[1] *Chatham Standard*, May 9.
[2] *Dhulipala Kameswara Rao* v. *Wyles* [1949] 2 All E.R. 685. *British Medical Journal*, November 12, 1949, p. 1119.

Universities and Colleges

UNIVERSITY OF OXFORD

A fund for research in leukaemia has been inaugurated by a gift of £1,000 by the Rev. Emlyn Williams, a naval chaplain whose wife died recently of acute leukaemia. Those wishing to contribute to this fund should communicate with the Registrar, University Registry, Oxford.

NATIONAL UNIVERSITY OF IRELAND

UNIVERSITY COLLEGE, DUBLIN

Dr. Denis Kenry O'Donovan has been appointed Associate Professor of Medicine in University College, Dublin. Professor O'Donovan, who is chairman of the Scientific Committee of the Irish Medical Association, has contributed a large number of papers to various scientific journals. He is on the staff of St. Vincent's Hospital, Dublin, and is a member of the Cortisone Committee of the Medical Research Council of Ireland.

INFECTIOUS DISEASES AND VITAL STATISTICS

Summary for British Isles for week ending **November 17** (No. 46) and corresponding week 1950.

Figures of *cases* are for the countries shown and London administrative county. Figures of *deaths* and *births* are for the 126 great towns in England and Wales (London included), London administrative county, the 16 principal towns in Scotland, the 10 principal towns in Northern Ireland, and the 13 principal towns in Eire.

A blank space denotes disease not notifiable or no return available.

The table is based on information supplied by the Registrars-General of England and Wales, Scotland, N. Ireland, and Eire, the Ministry of Health and Local Government of N. Ireland, and the Department of Health of Eire.

CASES in Countries and London	1951					1950				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria	38	1	10	1	2	76	6	9	5	6
Dysentery	240	44	77	2	1	474	74	153	3	
Encephalitis, acute	6	1	1	0		5	0	0	0	
Enteric fever: Typhoid	4	0	0	1	2	5	1	0	1	1
Paratyphoid	14	0	0	0		1	0	0	2	1(B)
Food-poisoning	84	18		0		215	21		1	
Infective enteritis or diarrhoea under 2 years				17	31				22	20
Measles*	2,084	47	18	191	92	10,132	766	112	57	104
Meningococcal infection	42	3	16	2	1	33	4	12	1	1
Ophthalmia neonatorum	45	4	6	1	1	38	11	12	1	
Pneumonia†	467	31	204	7		558	40	205	11	
Poliomyelitis, acute: Paralytic	15	3	14	0	5	149	10	9	1	5
Non-paralytic	20	2								
Puerperal fever§	238	43	10	2		67	9	6	0	2
Scarlet fever	1,473	139	308	31	51	1,386	99	206	48	109
Tuberculosis: Respiratory			140	33				143	38	
Non-respiratory			22	5				17	2	
Whooping-cough	1,833	62	320	62	105	4,130	340	496	31	41

DEATHS in Great Towns	1951					1950				
	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire	Eng. & Wales	Lond.	Scot.	N. Ire.	Eire
Diphtheria	0	0	0	0	0	0	0	0	0	0
Dysentery		0		0			0		0	
Encephalitis, acute		0			0		0			0
Enteric fever	1	0	0	0		0	0	0	0	
Infective enteritis or diarrhoea under 2 years	7		1	0	0	14		5	1	4
Influenza	11	1	1	0	0	16	3	4	0	0
Measles		0	0	0	0		0	0	0	0
Meningococcal infection		0	1				0	0		
Pneumonia	179	28		9	6	188	24		10	9
Poliomyelitis, acute	3	0			1	8	0			0
Scarlet fever		0	0	0	0		0	0	0	0
Tuberculosis: Respiratory	145	18	26	1	13	151	16	42	4	5
Non-respiratory		1	4	1	0		2	4	2	3
Whooping-cough	1	0	1	1	0	3	0	1	0	0
Deaths 0–1 year	189	31	32	8	20	250	28	32	12	17
Deaths (excluding stillbirths)	4,674	753	581	118	191	5,107	793	649	108	199
LIVE BIRTHS	6,167	1040	710	200	362	6,549	1062	789	206	374
STILLBIRTHS	187	23	23			174	20	27		

* Measles not notifiable in Scotland, whence returns are approximate.
† Includes primary and influenzal pneumonia.
§ Includes puerperal pyrexia.

Vital Statistics

Infectious Diseases

In England and Wales during the week ending November 17 notifications of scarlet fever rose by 241, whooping-cough by 208, measles by 149, and dysentery by 48.

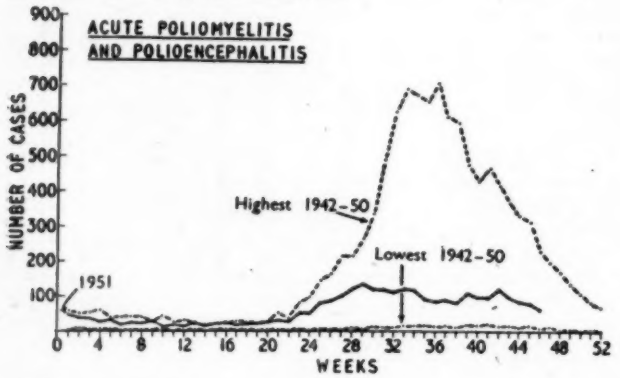
Small rises in the incidence of scarlet fever occurred in most regions of the country, the largest being Lancashire 46. The increased incidence of whooping-cough was mainly contributed by two regions, the south-east and Yorkshire, with rises of 62 and 92 respectively. Only small variations occurred in the local trends of measles, with the exceptions of Warwickshire and Lancashire, where a rise of 69 was recorded in each county. In the combined area of London, the south-eastern counties, and south-western counties notifications of measles were 28 fewer than in the preceding week. The number of notifications of diphtheria was 4 fewer than in the previous week. The chief features of the local returns of diphtheria were a rise of 9 in Staffordshire and a fall of 4 in Lancashire. Of the 14 cases of diphtheria in Staffordshire 9 were notified in Bilston M.B.

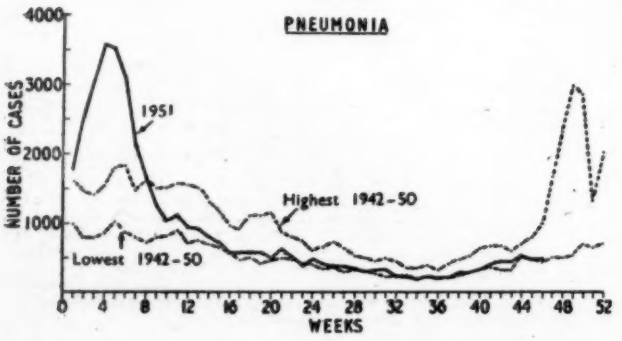
The number of notifications of acute poliomyelitis was 11 fewer for paralytic cases and 2 fewer for non-paralytic cases than in the preceding week. The largest returns during the week were Yorkshire West Riding 18 (Halifax C.B. 3, Maltby U.D. 3); Lancashire 12; London 5.

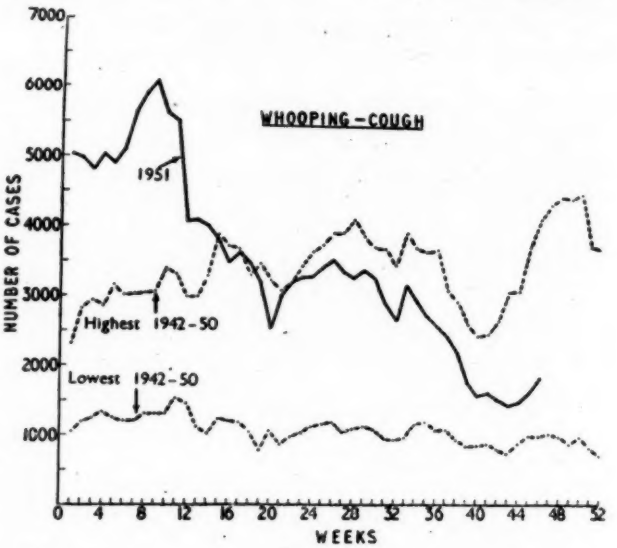
A fresh outbreak of dysentery, involving 10 persons, was notified from Dorset, Wareham M.B., during the week. The other large centres of infection were London 44 (Lambeth 8, Lewisham 7); Lancashire 36 (Liverpool C.B. 7); Middlesex 27 (Edmonton M.B. 9, Ealing M.B. 8); Surrey 15; Warwickshire 15; Yorkshire West Riding 13 (Saddleworth U.D. 8); Wiltshire 11.

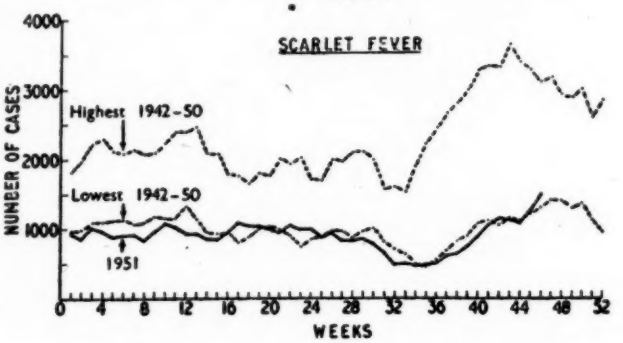
Graphs of Infectious Diseases

The graphs below show the uncorrected numbers of cases of certain diseases notified weekly in England and Wales. Highest and lowest figures reported during the nine years 1942–50 are shown thus -------, the figures for 1951 thus ————. Except for the curves showing notifications in 1951, the graphs were prepared at the Department of Medical Statistics and Epidemiology, London School of Hygiene and Tropical Medicine.









Death from Infected Duck Eggs

A man, aged 71, died on November 17 after eating two duck eggs infected with *Salmonella typhimurium*. On November 9 he fried for lunch one of the two eggs, which had previously been given to him by a friend. In the evening he felt unwell, and because he did not feel like eating much he fried the second duck egg. The next day he developed diarrhoea, and two days later he was admitted to hospital. In spite of treatment with chloramphenicol and, later, penicillin he died eight days after the onset of the infection. Stool cultures repeatedly showed *Salm. typhimurium*.

At the inquest the pathologist gave the cause of death as bronchopneumonia and toxaemia following enteritis due to *S. typhimurium*. He also stated that boiling the eggs for 10 minutes destroys the bacteria. (For a Parliamentary reply on the dangers of duck eggs see p. 1408.)

Week Ending November 24

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 1,476, whooping-cough 1,891, diphtheria 29, measles 2,047, acute pneumonia 430, acute poliomyelitis 57, dysentery 221, paratyphoid fever 14, and typhoid fever 5.

Quarterly Returns for Northern Ireland

The birth rate during the first quarter of 1951 was 21.2 per 1,000 and was 1.2 below the average of the first quarters of 1946–50. The infant mortality rate was 51 per 1,000 registered births and was 7 above the rate for the corresponding quarter of 1950 but 4 below the average of the five preceding first quarters. The general death rate was 20.4 per 1,000, and this rate was 7.1 above the rate for the March quarter of 1950 and 5.6 above the average for the first quarters of 1946–50. Deaths attributed

to influenza were 827, compared with 75 in the preceding first quarter. Other deaths from epidemic diseases were 29 from diarrhoea and enteritis under 2 years, 5 from whooping-cough, 1 from diphtheria, and 1 from measles. Deaths from respiratory tuberculosis numbered 179 and from other forms of tuberculosis 32. These were respectively 31 and 18 below the average of the five preceding first quarters. A sharp rise occurred in the incidence of dysentery; 115 cases were notified compared with a total of 71 for the four preceding quarters.

Scottish Vital Statistics

The following preliminary statement on Scottish vital statistics for the third quarter of 1951 has been issued by the Registrar-General for Scotland. The birth rate was 17.0 per 1,000 estimated population. This is 0.3 below the rate for the corresponding quarter of 1950 and 2.1 below the average of the past five years. The average for the pre-war five years was 17.2. The death rate was 10.2 per 1,000 estimated population. This is the same as that for the third quarter of 1950 but 0.1 below the average of the past five years. The pre-war five years' average was 10.9.

The infant mortality rate was 32 per 1,000 live births; it was 1 below that for the corresponding quarter of the previous year and 9 below the past five years' average. The neonatal rate (deaths of infants under 1 month) was 21, and was 1 fewer than that for the corresponding quarter of 1950.

The death rate from all forms of tuberculosis was 36 per 100,000. This was 7 below that for the third quarter of 1950 and 25 below the average of the past five years. From respiratory tuberculosis the rate was 29 (22 below the average).

Industrial Accidents and Diseases

The number of workpeople (other than seamen) in the United Kingdom whose deaths from accidents in the course of their employment were reported in October was 139, compared with 106 (revised figure) in the previous month and 112 (revised figure) for October, 1950. Of these deaths, 41 were underground in coal mines and 20 were in building operations.

The following cases of industrial disease were notified during the month: lead poisoning 9, aniline poisoning 1, anthrax 3, epitheliomatous ulceration 23, chrome ulceration 15; total 51. There were no deaths (*Ministry of Labour Gazette*, November, 1951).

Medical News

The Gowers Library at Queen Square

Sir Ernest Gowers, chairman of the National Hospitals for Nervous Diseases, was in the chair at the National Hospital, Queen Square, on November 29 when Sir Gordon Holmes opened the Gowers Library. This library of books of all kinds, light and serious, is meant for the use of both patients and staff. The money for the library, Sir Ernest Gowers pointed out, comes from bequests made by Sir William Gowers's two daughters, both of whom suffered from retinitis pigmentosa, and devoted their lives to the welfare of others. Sir Gordon Holmes paid a tribute to Sir Ernest's sisters, and read a paper on Sir William Gowers which appears at page 1397 of the present issue of the *Journal*. After the Countess Rothes, a member of the board of governors, had spoken, Mr. P. D. Power, also a member of the board and chairman of the library committee, presented Lady Holmes with a lamp, and Sir Ernest Gowers, on behalf of Lady Gowers, with a mirror; both of these gifts had been made from material that had survived bomb damage during the war.

A Book for Christmas

50 Years of Medicine, containing in book form articles surveying the progress of medicine and surgery during the first half of this century which appeared in a special number of the *Journal* last year, is again available. Very pleasantly brought out, and handsomely bound, not only does it look impressive but the information it gathers together is useful and enlightening, and is of interest to both lay and medical readers. Over 300 pages of text, a complete index, and 32 illustrations make this a valuable book to have, and, incidentally, an excellent Christmas present. Costing 15s., *50 Years of Medicine* may be obtained through booksellers, or direct (post free) from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

"Any Questions?"

This month, in good time for Christmas, the first book of *"Any Questions?"* will be published. The book contains a selection of the best questions and answers which have appeared in the "Any Questions?" section of the *Journal* since the feature was started eight years ago. Many of these authoritative answers give practical information not yet in the textbooks. This book is confidently recommended to all practitioners. *"Any Questions?"* is strongly bound in cloth, small enough to fit the pocket, and costs 7s. 6d. (postage 6d.). Copies may be obtained on application to the Publishing Manager, B.M.A. House, Tavistock Square, W.C.1.

Mr. Attlee's Doctor Honoured

It was announced on November 29 that Dr. Walter Hannay, Mr. Attlee's personal doctor, is to receive a knighthood. Dr. Hannay is clinical assistant at St. Mary's Hospital skin department and at the West End Hospital for Nervous Diseases, and qualified from Guy's in 1928.

The Supplementary Reserve

Many doctors who have served as officers in the British or Indian Armies or in the armed Forces of a Commonwealth country may be prevented from joining the Territorial Army through living too far from a T.A. unit or by being unable to spare the time which T.A. service entails. Nevertheless they may wish to serve with the R.A.M.C. in a national emergency. The War Office reminds them the way is open through the Supplementary Reserve, and those interested are invited to apply to the Under Secretary of State, The War Office (AMD 1) for full details.

Medical Association for the Prevention of War

The third bulletin states that the society now has over 230 members, and a branch has been formed in Birmingham. Similar movements are starting abroad (e.g., in Belgium), and on the proposal of the Union Nationale des Médecins pour la Paix it is hoped to hold an international conference next year. The working party on "The Ethical Responsibilities of Doctors in Relation to War" has been studying bacteriological warfare.

Change in Special Diets for Invalids

The Ministry of Food announces that patients receiving a low salt diet for congestive cardiac failure may in future be allowed one extra meat ration a week in exchange for their bacon and cheese rations. The extra ration may be granted for a period of six months. The allowance may be renewed on production of further medical certificates at six-monthly intervals. The arrangements for extra rations for invalids described in MED.2 (1950) are revised accordingly. This allowance does not apply to patients on low salt diets for other conditions. Patients with hypoproteinaemia, hepatitis, and certain forms of renal disease are already allowed extra meat. For patients suffering from hypertension, the Special Diets Committee is satisfied that only the most rigid salt restriction is of value in controlling blood

pressure, and provision has already been made for patients under treatment with the Kempner Rice Diet to obtain three extra rations of sugar in exchange for their bacon, cheese, and fat rations.

Distinguished Visitor

Dr. Gregorio Marañon, professor of endocrinology at the University of Madrid, director of the Institute of Experimental Pathology at Madrid General Hospital, and director of the Institute of Experimental Endocrinology at the Consejo Superior de Investigaciones Cientificas, is at present visiting Britain under the auspices of the British Council. His daughter is the wife of Mr. Tom Burns, of the publishing firm of Burns, Oates and Washbourne, Ltd.

Ulster Paediatric Society

A meeting of the society was held in the Royal Belfast Hospital for Sick Children on October 24 with Professor Allen in the chair. A discussion on recurrent abdominal pain in childhood was opened by Dr. M. J. L. Frazer and Mr. Ian Fraser. A meeting of the society was held in the City and County Hospital, Londonderry, on November 9, with Professor F. M. B. Allen in the chair, when a discussion on juvenile delinquency was opened by Mr. E. W. Jones, K.C., M.P., and Dr. Donald Dawson.

Emergency Bed Service: Applications and Admissions

During the seven days ending December 3 the number of applications made by doctors to the London Emergency Bed Service for admission of patients was 849, of whom 92.22% were admitted.

Wills

Mr. Gathorne Robert Girdlestone left £57,272. After making various bequests he left the ultimate residue to the Nuffield Orthopaedic Centre.

COMING EVENTS

Heberden Society

The annual general meeting will be held on December 7 and 8. Papers will be read on the first day at Westminster Hospital, and the annual dinner held in the evening; the following day will be devoted to the general meeting to be followed by further papers, all dealing with various aspects of A.C.T.H. and cortisone. Full details may be obtained from the general secretary, Heberden Society, c/o Empire Rheumatism Council, Tavistock House (N), Tavistock Square, W.C.1.

British Sociological Association

Dr. J. N. Morris (director of the M.R.C. Social Medicine Research Unit) will read a paper on "Research in Social Medicine" on December 15 at 3 p.m. at the London School of Economics (Room 2), Houghton Street, Aldwych, W.C.2. All interested are invited to be present. The association was founded on February 3 this year to promote interest in the study of society, and medical men will be welcomed as members. Full information can be obtained from the secretary, Skepper House, 31, John Adam Street, W.C.2.

Australasian Medical Congress

The eighth session will be held in Melbourne, August 22–29, 1952. Members and intending members of the congress who wish to present papers should send them to the honorary secretaries of sections (e.g., anaesthesia, dermatology, medicine, etc.) before February 29, or if this is not possible a précis of the proposed paper together with its title. Intending speakers will be notified not later than April 30 whether or not their papers have been accepted. All correspondence should be addressed to 426, Albert Street, East Melbourne, C.2, Victoria.

SOCIETIES AND LECTURES

A fee is charged or a ticket is required for attending lectures marked ●. Application should be made first to the institution concerned.

Monday

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, Cavendish Square, W.—December 10, 8.30 p.m., "*The Uses of Polymethonium*," discussion to be introduced by Professor M. Leonard Rosenheim and Dr. G. E. Hale Enderby.

●POSTGRADUATE MEDICAL SCHOOL OF LONDON, Hammersmith Hospital, Ducane Road, W.—December 10, 4 p.m., "*Mitral Stenosis*," by Dr. Raymond Daley.

ROYAL EYE HOSPITAL St. George's Circus, Southwark, London, S.E.—December 10, 5 p.m., "*Clinical Aspects of Accommodation. Treatment of the Hypermetrope*," by Dr. T. H. Whittington.

Tuesday

BRITISH POSTGRADUATE MEDICAL FEDERATION.—At London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C., December 11, 5.30 p.m., "*Blood Coagulation in Theory and Practice*," by Dr. R. G. Macfarlane.

CHELSEA CLINICAL SOCIETY.—At South Kensington Hotel, 41, Queensgate Terrace, London, S.W., December 11, 8.30 p.m., 3rd Ordinary Meeting of 55th session. "*The Doctor in the Magistrate's Court*," discussion to be opened by Sir Laurence Dunne, Senior Metropolitan Magistrate, followed by Dr. Philip Addison, Assistant Secretary, Medical Defence Union.

EDINBURGH POSTGRADUATE BOARD FOR MEDICINE.—At Anatomy Lecture Theatre, University New Buildings, Edinburgh, December 11, 5 p.m., "*Malignant Malnutrition*," by Dr. Lucy Wills.

●INSTITUTE OF DERMATOLOGY, Lisle Street, Leicester Square, London, W.C.—December 11, 5.30 p.m., "*Pyococcal Infection of the Skin*," by Dr. G. B. Dowling.

●ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, London, S.W.—December 11, 5 p.m., "*The Lower Oesophagus*," by Dr. J. B. Harman.

ST. ANDREWS UNIVERSITY.—At Lecture Theatre, Materia Medica Department, Medical School, Small's Wynd, Dundee, December 11, 5 p.m., "*Some Clinical Problems of Mass Radiography*," by Dr. E. R. Boland.

WEST END HOSPITAL FOR NERVOUS DISEASES, 40, Marylebone Lane, London, W.—December 11, 5.30 p.m., neurological demonstration by Mr. C. Worster-Drought.

Wednesday

●DAVIDSON CLINIC, 58, Dalkeith Road, Edinburgh.—December 12, 8 p.m., "*Psychology and Life*," by Dr. Winifred Rushforth.

●INSTITUTE OF DERMATOLOGY, Lisle Street, Leicester Square, London, W.C.—December 12, 5.30 p.m., "*X-ray Technique*," by Dr. C. W. McKenny.

INSTITUTE OF UROLOGY.—At St. Paul's Hospital, Endell Street, London, W.C., December 12, 4.30 p.m., "*Disorders of Micturition in the Female*," by Mr. H. G. Hanley.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, London, W.C., December 12, 4 p.m., "*The Approach to Specialism*," Bradshaw Lecture by Sir Ernest Finch.

ROYAL EYE HOSPITAL, St. George's Circus, Southwark, London, S.E.—December 12, 5.30 p.m., "*Pseudoglioma*," by Mr. R. P. Crick.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW, 242, St. Vincent Street, Glasgow.—December 12, 5 p.m., "*Ultra-radical Surgery in Advanced Pelvic Malignant Disease*," Miss Weild Lecture by Mr. C. D. Read.

ROYAL SOCIETY OF ARTS, John Adam Street, Adelphi, London, W.C.—December 12, 2.30 p.m., "*Food and Fads*," Armstrong Memorial Lecture by Dr. Charles Hill, M.P. (Parliamentary Secretary to the Ministry of Food).

SOCIETY OF CHEMICAL INDUSTRY: NUTRITION PANEL—FOOD GROUP.—At Burlington House, Piccadilly, London, W., December 12, 6.15 p.m., "*Sugar*"—"*Its Production, Purification, and By-products*," by Mr. H. S. C. De Whalley, F.R.I.C., M.I.Chem.E.; "*Its Place in the Dietary—Normal and Abnormal Metabolism*," by Dr. R. D. Lawrence.

Thursday

ALFRED ADLER MEDICAL SOCIETY.—At 11, Chandos Street, London, W., December 13, 8 p.m., "*Abreactive Techniques: Physiological Aids to Psychotherapy*," by Dr. A. Spencer Paterson. Discussion to be opened by Dr. T. A. Munro.

BRITISH INSTITUTION OF RADIO ENGINEERS.—At London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, London, W.C., December 13, 6.30 p.m., "*Electronic Analogues of Physiological Processes*," by Mr. W. Grey Walter, Sc.D., and Mr. H. W. Shipton, A.M.Brit.I.R.E.

CHADWICK TRUST.—At St. Mary's Hospital Medical School, Norfolk Place, Praed Street, Paddington, London, W., December 13, 4.30 p.m., "*The Epidemiology of Some Skin Infections*," Malcolm Morris Memorial Lecture by Professor Robert Cruickshank.

●INSTITUTE OF CHILD HEALTH, Hospital for Sick Children, Great Ormond Street, London, W.C., December 13, 5 p.m., *"Psychological Problems in Early Childhood,"* by Dr. Mildred Creak.
●INSTITUTE OF DERMATOLOGY, Lisle Street, Leicester Square, London, W.C.—December 13, 5.30 p.m., *"The Pyogenic Cocci and Mycobacteria in Skin Diseases,"* by Dr. J. O. Oliver.
LIVERPOOL MEDICAL INSTITUTION, 114, Mount Pleasant, Liverpool.—December 13, 8 p.m., pathological meeting. Demonstration of specimens. *"Atypical Herpetic Infections,"* by Dr. K. McCarthy.
LONDON JEWISH HOSPITAL MEDICAL SOCIETY.—At Medical Society of London, 11, Chandos Street, W., December 13, 8.30 p.m., *"Peptic Ulcer,"* film.
●ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, London, S.W.—December 13, 5 p.m., *"Psychosomatic Reactions,"* by Dr. E. B. Strauss.
ROYAL SOCIETY, Burlington House, Piccadilly, London, W.—December 13, 4.30 p.m., *"The Place of Viruses in Nature,"* Leeuwenhoek Lecture by Dr. C. H. Andrewes, F.R.S.
ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, 26, Portland Place, London, W.—December 13, 7.30 p.m., *"The African Child,"* by Dr. D. B. Jelliffe.
ST. ANDREWS UNIVERSITY.—At Lecture Theatre, Materia Medica Department, Medical School, Small's Wynd, Dundee, December 13, 5 p.m., *"Some Recent Work on the Viruses of the Psittacosis-lymphogranuloma Group and its Import,"* by Professor S. P. Bedson.

Friday

BIOCHEMICAL SOCIETY.—At Guy's Hospital Medical School, London, S.E., December 14, 2 p.m., 303rd meeting. Scientific papers will be read.
EUGENICS SOCIETY.—At Royal Society, Burlington House, Piccadilly, London, W., December 14, 5.30 p.m., *"Eugenic Experiments Conducted by the Nazis on Human Subjects,"* by Dr. C. P. Blacker.
●INSTITUTE OF DERMATOLOGY, Lisle Street, Leicester Square, London, W.C.—December 14, 5.30 p.m., *"Pyococcal Infections,"* clinical demonstration by Dr. G. B. Dowling.
KENT AND CANTERBURY HOSPITAL, Canterbury.—December 14, 8 p.m., clinical meeting.
●ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, London, S.W.—December 14, 5 p.m., *"Macrocytic Anaemias,"* by Dr. R. R. Bomford.
WEST KENT MEDICO-CHIRURGICAL SOCIETY.—At Miller General Hospital, Greenwich High Road, London, S.E., December 14, 8.30 p.m., *"Modern Trends in Rheumatism with Special Reference to the Endocrines,"* by Dr. Philip Ellman.

APPOINTMENTS

BENNIE, THOMAS Y., M.B., Ch.B., D.P.H., Medical Officer of Health, Burgh of Paisley.

EAST ANGLIAN REGIONAL HOSPITAL BOARD.—*Assistant Radiologist, (S.H.M.O. status) in Peterborough Area,* J. J. Hurley, M.B., Ch.B., D.P.H., D.M.R.E. *Ear, Nose and Throat Registrar at Peterborough and District Memorial Hospital,* I. Lopert, L.R.C.P &S Ed., D L.O.

EDWARDS, L. R. L., M.D., D.P.H., Medical Officer of Health and School Medical Officer, Borough of Beckenham, and Assistant Medical Officer, Kent County Council.

GALLOWAY, T. McL., M.B., Ch.B., M.R.C.P.Ed., D.P.H., Dr.P.H., Deputy County Medical Officer of Health and Deputy County School Medical Officer, Worcestershire.

LYTTLE, GEORGE GIBSON, O.B.E., M.B., B.S., Appointed Factory Doctor for South Belfast.

MANCHESTER REGIONAL HOSPITAL BOARD.—*Consultant Psychiatrist/Medical Superintendent, Springfield Hospital, Manchester,* R. A. Blair, M.B., Ch.B., F.R.F.P.S. *Assistant Radiologist, Wigan and Leigh Hospitals,* J. T. Furnival, M.R.C.S., L.R.C.P., D.M.R.D. *Assistant Radiologist, Oldham and District Hospitals,* D. A. H. Walton, M.B., D M R.D.

PARKER, JEAN B., M.B., Ch.B., Senior Assistant, Care and Aftercare Service, City of Sheffield.

SWINNEY, WILLIAM DIXON, M.B., Ch.B., D.P.H., Medical Officer of Health, City of Peterborough; Deputy County Medical Officer, County of the Soke of Peterborough; Deputy School Medical Officer, Peterborough Joint Education Board.

THOMSON, KENMURE JAMES, M.B., Ch.B., D.P.H., Medical Officer of Health, Border Rural District, and Assistant County Medical Officer, Cumberland.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Smith.—On October 25, 1951, in Singapore, to Dr. M. Thorben Smith, wife of T. E. Smith, a daughter—Erica.

DEATHS

James.—On November 13, 1951, at Nyeri, Kenya, Algernon Meyrick Alban James, M.D.Brux., M.R.C.S., L.R.C.P., aged 72.
Meldon.—On November 27, 1951, at The Limes, Hagley Road, Stourbridge, Worcs, George James Meldon, M.D., aged 66.
Rhind.—On November 24, 1951, his 79th birthday, at 27, Villiers Road, Woodthorpe, Nottingham, Alexander Low Rhind, M.B., Ch.B.
Strachan.—On November 26, 1951, at Hurworth-on-Tees, Frederick James Strachan, *M.C.*, M.B., B.S.
Subrahmanyan.—On November 20, 1951, killed in an airplane crash between New Delhi and Calcutta, Kuppuswami Subrahmanyan, M.B., B.S.
Wilkinson.—On November 18, 1951, George Wilkinson, M.B., B.Ch., D.T.M., of C.M.S. Fukien Mission, aged 86.

Any Questions?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

Gadgets for the Armless

Q.—*A man with only one arm cannot hold a telephone receiver to his ear and at the same time write down a message. Has a gadget been devised to cope with this?*

A.—Several methods have been devised whereby a man with one arm amputated can use the telephone and leave

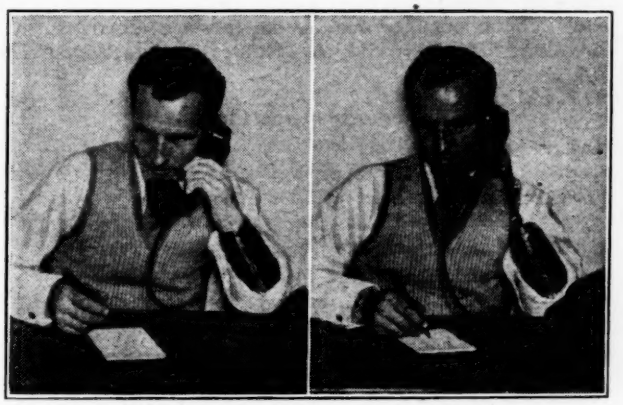


FIG. A FIG. B

a hand free for writing. The instrument may be held in the standard artificial hand supplied with a conventional prosthesis (Fig. A). Appliances have also been devised consisting essentially of a rubber grip for the instrument, fixed to a metal arm attached to an adaptor by which the appliance can be plugged into the bayonet fitting of the prosthesis (Fig. B). The appliance can be bent to suit the individual. Several appliances on this principle are available and a patient can select that most suited to his own requirements.

Incidence of Drug Addiction

Q.—*Has there been any change in the incidence of drug addiction in Britain since the introduction of the Dangerous Drugs Acts?*

A.—The question is difficult, since there are few records from before the passing of these Acts on which to base a satisfactory reply. Briefly, however, it is clear from the nature of the offences disclosed during the last 30 years in Britain, and from the state of affairs in one or two other countries, that without the operation of the Dangerous Drugs Acts and Regulations we might be in a very sorry plight. The main changes in drug addiction have been within the last few years, when a number of synthetic substitutes for the well-known drugs have appeared on the market. There has also been a considerable decrease in the smoking of opium, but an increase in the use of Indian hemp or hashish in the form of cigarettes.

Fat-free Diet after Cholecystectomy

Q.—*Following a recent cholecystectomy, I have been advised to take a "fat-free" diet. To what extent should the diet live up to its name, and for how long must I stick to it? Which fatty foods are definitely forbidden, and which permitted? May I take spirits and beer in moderate amounts?*

A.—If there is nothing in the history to suggest liver damage there is little reason to restrict fats at all, although

cooked fats may well cause dyspepsia, and thus would be avoided by the patient anyhow. Spirits and beer can be taken in moderation unless there is evidence of recent hepatitis or permanent liver damage.

If in the past history there are any incidents that may have led to liver damage, such as repeated hepatitis or attacks of obstructive jaundice, with or without infective cholangitis, a low-fat high-protein diet would be advisable. The patient should avoid cooked fats and take only moderate amounts of uncooked fats, such as butter and milk. The high protein intake should be continued for a year or more, but the restriction of fat can be relaxed after a few months.

Cousin Marriage

Q.—*Where can I find information on whether first cousins should marry?*

A.—On page 132 of the book "*Any Questions?*" The book can be obtained for 7s. 6d. (postage 6d.) from the Publishing Manager, B.M.A. House, Tavistock Square, W.C.1.

Actinomycosis of the Chest Wall

Q.—*I have a patient with a very long-standing actinomycosis of the chest wall too widespread for surgery. Penicillin has been tried without benefit. Are any of the newer antibiotics, such as "aureomycin" or "terramycin," of any use, and, if so, what dosage would you recommend?*

A.—It is exceedingly rare to meet with a case of actinomycosis of the chest wall, however long-standing or widespread, which does not respond to penicillin if this drug is given in adequate dosage over a sufficiently long period. Most cases reported to be resistant to penicillin do in fact respond to higher doses. I have known cases which failed to respond to 2 million units a day but which did respond to 3 million units. The drug should be continued for at least two months; some cases require longer treatment than this. Treatment should never be stopped because the sinuses have all healed and all evidence of inflammation has disappeared, for recurrence is likely if the course is of insufficient duration. Some patients who have apparently failed to respond to penicillin alone have responded when this drug has been combined with the sulphonamide drugs, particularly sulphadiazine by mouth.

However, there are cases reported in the literature which have been treated with the newer antibiotics, particularly streptomycin and aureomycin, and the disease has apparently responded in a dramatic fashion. The most frequently suggested dosage of streptomycin has been 2 g. daily for one month followed by 1 g. daily for a further month, and in some instances continuing with the same drug for another month on a somewhat reduced dosage.

The dosage of aureomycin has varied considerably. In one report 750 mg. was given by mouth every four hours for 10 days, after which each dose was reduced to 500 mg., and this was continued for a further 18 days. A good result has also been reported in the cervico-facial type of the disease with "diasone" (*J. Amer. med. Ass.*, 1948, **138**, 955). It is doubtful if this drug should be used before other antibiotics have proved ineffectual. More recently there have been reports of success with chloramphenicol.

Some clinicians recommend combining penicillin therapy with simultaneous administration of streptomycin, so that the organism may be subjected to the effects of both drugs at the same time.

Syringe-transmitted Hepatitis

Q.—*A foreign doctor tells me that boiling of syringes is not sufficient to prevent syringe-transmitted hepatitis. It this true, or are we general practitioners safe with boiling?*

A.—The virus of serum hepatitis has been shown to be destroyed by heating at 60° C. for 10 hours, and no virus is known to withstand boiling. It is reasonable, therefore, to suppose that boiling for five minutes will render a syringe safe in this respect, though absolute proof requires human-volunteer experiments which have not yet been made. In any case, the sterilization of syringes by boiling represents the nearest practicable approach yet devised to a theoretically perfect technique (see *Medical Research Council War Memorandum* No. 15, 1945). If there is any risk that a properly boiled syringe can remain infected with hepatitis virus, the risk is probably small enough to be ignored. The use of the same syringe for more than one patient, without intervening sterilization, presents a much greater risk of transmitting hepatitis.

Occupational Risk of Vets?

Q.—*A vet who is said to have had brucellosis on two occasions and frequently handles Brucella abortus vaccine has a chronic conjunctivitis, thought to be due to sensitivity to this organism. (a) Is this a tenable diagnosis, and how may it be confirmed? (b) If so, is it possible to desensitize him? (c) Is there any risk of precipitating chronic brucellosis during desensitization?*

A.—Under the conditions mentioned, sensitivity to *Brucella abortus* vaccine is a tenable diagnosis which could be confirmed by watching the effect of the vaccine diluted, say, 1 in 100, and if no reaction diluted 1 in 10, when dropped into the eye. This might, however, be a very unpleasant proceeding. A skin test with "brucellin" would certainly be positive with the history given and would give no help. Desensitization with an abortus vaccine could never produce chronic brucellosis, but the clinical benefit obtained therefrom would be problematical. More certain results would be obtained by protecting the eyes with eye shields, and by taking strict precautions to ensure that any vaccine which might contaminate the skin is washed away by frequent cleansing of the hands.

Operative Relief of Tinnitus

Q.—*What operations are there for the relief of long-standing tinnitus? How successful are they?*

A.—There have been many attempts to abolish tinnitus by operation, usually by section of the eighth cranial nerve or destruction of the labyrinth. In very long-standing cases, however, the auditory area of the cerebral cortex is probably affected, so that a successful result is very doubtful. Dandy (*Surg. Gynec. Obstet.*, 1941, **72**, 421) claims 50% of cures by nerve section. Recently Lempert has claimed success in many cases after resection of the tympanic plexus of nerves, but this has not been confirmed by other operators.

Aetiology of Hyperacusis

Q.—*What are the causes of hyperacusis? Is there any close association with menopausal disorders or hypertension?*

A.—Abnormally acute hearing may result from paralysis of the branch of the facial nerve supplying the stapedius muscle, but the condition is also frequently functional occurring in hysteria. It might thus be associated with menopausal disorders, but not with hypertension.

All communications with regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1. TELEPHONE: EUSTON 4499. TELEGRAMS: *Aitiology, Westcent, London.* ORIGINAL ARTICLES AND LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated.

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